DataGeneral

DIAGNOSTIC LISTING

LISTING

096-000080-02

PROGRAM

MULTI-PROGRAMMING
RELIABILITY TEST

TAPE

095-000114-02

ABSTRACT

THE MULTI-PROGRAMMING RELIABILITY TEST CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR AND PERIPHERAL TESTS AND A SIMPLE SUPERVISOR PROGRAM.

```
0001 MPRTS MACRO REV 02                14:32:01 10/11/74
01
02
03
04
05
06
07          ;*****************************************************************
08          ;
09          ; NAME: MORT.SR                          PART NUMBER: 094-000486
10          ;
11          ;
12          ; DESCRIPTION: MULTI-PROGRAMMING RELIABILITY TEST
13          ;
14          ;
15          ; REVISION HISTORY:
16          ;
17          ;       REV.            DATE
18          ;
19          ;       00              04/11/73
20          ;       01              03/22/74
21          ;
22          ;
23          ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1973, 1974
24          ; ALL RIGHTS RESERVED.
25          ;*****************************************************************
```

```
0002 MPRTS
01
02                  ;
03                  ;       MULTIPROGRAMMING RELIABILITY TEST
04                  ;1.     ABSTRACT
05                  ;               THE 8021 MULTIPROGRAMMING RELIABILITY TEST
06                  ;               CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR
07                  ;               AND PERIPHERAL TESTS AND A SIMPLE
08                  ;               SUPERVISOR PROGRAM, (THE DIAGNOSTIC LINKER)
09                  ;
10                  ;               THE DIAGNOSTIC LINKER IS A PROGRAM
11                  ;               DESIGNED TO "LINK" THE VARIETY OF
12                  ;               PROCESSOR AND PERIPHERAL TESTS IN
13                  ;               SUCH A FASHION THAT THEY MAY BE
14                  ;               RUN CONCURRENTLY.  THEREBY, TESTING
15                  ;               THE INTERACTIVE CAPABILITIES OF
16                  ;               THE PROCESSOR AND ITS PERIPHERAL
17                  ;               EQUIPMENT.
18                  ;
19                  ;2.     MACHINE REQUIREMENTS
20                  ;2.1    NOVA 800 PROCESSOR
21                  ;2.2    16K TO 128K OF READ WRITE MEMORY
22                  ;               (ALLOWS FOR EXPANSION IN 1K INCREMENTS
23                  ;               BUT MEMORY MUST BE CONTIGUOUS)
24                  ;2.3    OPTIONAL EQUIPMENT
25                  ;2.3.1  8021 MULTIPROGRAMMING OPTION
26                  ;2.3.2  FIXED HEAD DISK
27                  ;2.3.3  MOVING HEAD DISK (DRIVE 0)
28                  ;       THE TEST WILL INDICATE WHICH ADAPTER SIDE
29                  ;       THE DISK CONTROL IS ON "B" IF PRIMARY COMPUTER(J2)
30                  ;       "A" IF A P PULSE WAS REQUIRED TO FIND THE DISK(J3)
31                  ;2.3.4  MAGNETIC TAPE (DRIVE 0)
32                  ;2.3.5  REAL TIME CLOCK
33                  ;2.3.6  FLOATING POINT UNIT
34                  ;2.3.7  MUL/DIV
35                  ;2.3.8  CASSETTE (DRIVE 0)
36                  ;2.4.8  LINE PRINTER
37                  ;
38                  ;2.5    PREREQUISITES
39                  ;2.5.1  SOFTWARE PREREQUISITES
40                  ;               THE SYSTEM SHOULD BE CAPABLE
41                  ;               OF RUNNING ALL INDIVIDUAL LOGIC AND
42                  ;               RELIABILITY TESTS PERTAINING TO THE
43                  ;               PROCESSOR AND ITS PERIPHERAL EQUIPMENT
44                  ;               BEFORE ATTEMPTING TO RUN THIS TEST
45                  ;2.5.2  SYSTEM SETUP
46                  ;               IF THE MOVING HEAD DISK IS TO BE
47                  ;               EXERCISED IT MUST HAVE A PACK INSTALLED
48                  ;               IN DRIVE 0 AND BE IN THE READY STATE
49                  ;
50                  ;               IF MAGNETIC TAPE IS TO BE EXERCISED
51                  ;               DRIVE 0 MUST BE ON LINE WRITE ENABLED
52                  ;
53                  ;               IF CASSETTE IS TO BE EXERCISED
54                  ;               DRIVE 0 MUST BE ON LINE WRITE ENABLED
55                  ;
56                  ;               IF THE LINE PRINTER IS TO BE EXERCISED
57                  ;               IT MUST BE ON LINE AND IN THE READY STATE
```

```
01              ;3.     SWITCH SETTINGS
02              ;3.1    AUTO-SIZE AND GO START AT 00002
03              ;3.2    MANUAL SELECT/DELETE TESTS START AT 00004
04              ;3.3    OTHER SWITCHES
05              ;               SW0=1 RELEASE AND ALLOW REASSIGNMENT
06              ;               OF MEMORY AFTER ERROR
07              ;               SW1=1 DELETE TYPEOUTS
08              ;               SW2=1 DELETE MEM ALLOCATION TABLE
09              ;               FROM TYPEOUTS
10              ;               SW3=1  CAUSES THE DELETION OF THE RANDOM
11              ;                       WAIT STATES IN THE TTY AND LPT
12              ;                       TESTS.
13              ;               SW4=1  AND TYPING A CHARACTER ON THE KEYBOARD
14              ;                       WILL CAUSE THE ELAPSED RUN
15              ;                       TIME AND ACCUMULATED ERRORS
16              ;                       TO BE TYPED ON THE TTY.
17              ;                       (NOTE: A RTC MUST EXIST)
18              ;4.     OPERATING PROCEDURES
19              ;4.1    LOAD THE PROGRAM VIA THE BINARY LOADER
20              ;4.2    SET SWITCHES TO:
21              ;               002 FOR AUTO SIZE AND GO
22              ;               004 FOR MANUAL SELECT/DELETE
23              ;4.3    PRESS START
24              ;4.4    PROCESSOR WILL TYPE:
25              ;               MULTIPROG. RELIABILITY (DATE OF ASSEMBLY)
26              ;               MEM SIZE MOD1K XXX (MAP OPTION EXISTS OR NOT)
27              ;               PROGRAM RUN LIST
28              ;               PROG# DESCRIPTION
29              ;4.5    IF START WAS 002 THE LIST OF
30              ;               PROGRAMS TO BE RUN CONCURRENTLY WILL
31              ;               THEN BE LISTED AND THE TEST SYSTEM
32              ;               WILL AUTO START
33              ;4.6    IF START WAS 004 LINKER WILL
34              ;               PAUSE AT THE END OF EACH TEST
35              ;               DESCRIPTION AND WAIT FOR KEYBOARD
36              ;               INPUT.  TYPING IN A SPACE WILL
37              ;               ENABLE THAT TEST TO BE RUN,
38              ;               TYPING IN ANY OTER CHARACTER WILL
39              ;               DELETE THAT TEST FROM BEING RUN
```



```
01              ;5.     ERROR DESCRIPTION
02              ;               MOST ERRORS DETECTED BY EITHER
03              ;               THE INDIVIDUAL TEST PROGRAMS OR
04              ;               BY THE DIAGNOSTIC LINKER WILL
05              ;               RESULT IN AN EXTENSIVE ERROR
06              ;               TYPEOUT.  SOME SMALL NUMBER OF
07              ;               HIGHLY IMPROBABLE ERRORS MAY RESULT
08              ;               IN A PROGRAM HALT IF THEY ARE
09              ;               OF A NATURE THAT THE LINKER CANNOT
10              ;               RECOVER FROM AND LOGICALLY PROCEED,
11              ;               (I.E. INTERRUPT STACK OVERFLOWS)
12              ;
13
14              ;5.1    ERROR FORMAT
15              ;               ERROR TYPEOUTS INCLUDE
16              ;               PROGRAM # AT TIME OF ERROR
17              ;               (SEE PROGRAM RUN LIST TO CORRELATE)
18              ;               CONTENTS OF AC'S 0, 1 AND 2 AT ERROR
19              ;               (AC3 WILL USUALLY BE TYPED FOLLOWING THE
20              ;               MEM ALLOCATION TABLE)
21              ;               LOGICAL SCRATCH AND DATA CHANNEL LIMITS
22              ;               MEMORY ALLOCATION TABLE
23              ;               PHYSICAL 1K PAGE# +MODULO 1K + LOGICAL ADDRESS
24              ;               CONTINUATION INFORMATION IN GROUPS
25              ;               OF 3 MEMORY LOCATIONS PERTINENT TO
26              ;               THE INDIVIDUAL TEST THAT FAILED
27              ;
28              ;5.2    ERROR ANALYSIS
29              ;               DUE TO THE INTERACTIVE NATURE OF
30              ;               THE TESTS INVOLVED, A SERIES OF
31              ;               ERROR TYPEOUTS WILL PROBABLY BE
32              ;               REQUIRED FOR ANALYSIS BEFORE A
33              ;               PROBLEM WILL BE ISOLATED.
34              ;               A RESTART AT 004 AND DELETION OF ALL
35              ;               BUT THE TEST THAT ORIGINALLY
36              ;               FAILED MAY HELP TO ISOLATE
37              ;               INTERACTIVE PROBLEMS AS FOLLOWS:
38              ;
39              ;5.2.1          IF THE TEST RUNS BY ITSELF THE PROBLEM
40              ;               IS INTERACTIVE-RE-ENABLE ONE OTHER TEST AT
41              ;               A TIME TO DETERMINE WHICH ONE IS THE PROBLEM.
42              ;               IF THE TEST DOES NOT RUN BY ITSELF
43              ;               RESORT TO SIMILAR BUT LOWER LEVEL TESTS
44              ;               FOR ISOLATION
```

```
10005 MPRTS
01              ;5.3    PERTINENT MEMORY LOC'S TYPED
02              ;
03              ;5.3.1  CHECKERBOARD III
04              ;               THE AC'S AT ERROR WILL INDICATE:
05              ;               GOOD DATA= BAD DATA=LOGICAL ADDRESS
06              ;
07              ;               IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
08              ;               CB,TK   TEST COUNTER
09              ;               0 OR 4  GENERATE CHECKERBOARD (4 IS COMPLIMENT)
10              ;               1 OR 5  DISTURB PASS
11              ;               2 OR 6  CHECK PATTERN
12              ;               3 OR 7  CHECKSUM THE # OF -1'S IN PATTERN
13              ;               CB,LC   STARTING LOGICAL ADDRESS OF "BEGIN"
14              ;                       RELOCATED TO SCRATCH
15              ;               CB,SE   AC3 AT ERROR CALL
16              ;
17              ;5.3.2  ARITHMETIC TEST
18              ;               THE AC'S WILL BE TYPED AS THEY WERE AT THE
19              ;               TIME OF ERROR DETECTION
20              ;
21              ;               IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
22              ;               AT,LC   STARTING ADDRESS OF ARITH IN SCRATCH
23              ;               AT,LO   LOW LIMIT OF SCRATCH AREA AFTER IT IS
24              ;                       REMAPPED FOR EXECUTION
25              ;               AT,LA   AT,LC IN RELATION TO AT,LO
26              ;                       (LOGICAL START OF ARITH AFTER REMAPPING)
27              ;               ATS@3   AC3 AT THE POINT OF ERROR DETECTION
28              ;               AT,LP   LOGICAL PAGE # THAT THE SCRATCH AREA
29              ;                       CONTAINING ARITH IS REMAPPED TO
30              ;               E ADRS  REFER TO THE LISTING OF ARITHMETIC TEST
31              ;                       AT THIS ADDRESS TO DETERMINE THE TEST
32              ;                       THAT FAILED
```

```
10006 MPRTS
01              ;
02              ;5.3.3  FIXED HEAD DISK TEST
03              ;               AC@     DATA EXPECTED
04              ;               AC1     DATA FOUND IN BUFFER
05              ;               AC2     CORE ADDRESS OF THE DATA IN AC@
06              ;                       THE DATA IN AC1 IS AT AC2+2
07              ;               IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED
08              ;               ADADR   STARTING DISK ADRS, OF THE 4 SECTORS
09              ;                       BEING EXERCISED
10              ;               NEXTWORD IN BUFFER
11              ;                       CONTENTS OF MEMORY AT AC2+1 AND AC2+3
12              ;                       THESE TWO WORDS SHOULD BE EQUAL
13              ;                       TO EACH OTHER
14              ;               STATUS ERROR
15              ;                       THE TYPEOUT WAS STARTED DUE TO
16              ;                        A DISK ERR,
17              ;               AC@     DISK STATUS THAT CAUSED THE TYPEOUT
18              ;               AC1     DIB FROM DISK AT ERROR
19              ;               AC2     @=WRITING  1=READING
20              ;               DSKCA   DOB TO DISK AT START OF OP, IN ERROR
21              ;               LAST DADRS      DOA TO DISK AT START OF
22              ;                                OPERATION IN ERR
23              ;
24              ;5.3.4  MOVING HEAD DISK
25              ;               AC@     GOOD DATA (SEE MH,SA)
26              ;               AC1     BAD DATA
27              ;               AC2     ADRS, OF GOOD DATA
28              ;                       BAD IS AT AC2+2 IF MH,SA IS A -#
29              ;               IN ADDITION THE FOLLOWING LOC'S ARE TYPED
30              ;               MH,SA   =@ OR 1 ERR WAS IN FIRST 2 WRDS
31              ;                        IN BUFFER
32              ;                       =-# ERR IS AT AC2+2
33              ;                       =AC2  ERROR WAS DISK STATUS
34              ;                              IN WHICH CASE:
35              ;                       AC2=DISK STATUS
36              ;                       AC1=DIC DISK
37              ;                       AC@=DIB DISK
38              ;               MHDST   DATA START IN CORE
39              ;               MHCST   DATA START FOR DCH MAP
40              ;               MHSTA   LAST DISK STATUS
41              ;               MH,CO   LAST DOA TO DISK
42              ;               MH,OC   LAST DOB TO DISK
43              ;
44              ;5.3.5  MAGNETIC TAPE TEST
45              ;               AC@     GOOD DATA
46              ;               AC1     BAD DATA
47              ;               AC2     ADRS OF BAD DATA (GOOD IS AT AC2-4)
48              ;       IN ADDITION THE FOLLOWING LOC'S ARE TYPED
49              ;               MODE    2=REWIND 1=WRITE 2=BACKSPACE OR READ
50              ;               STATUS  LAST TAPE STATUS
51              ;               MT,EK   ERROR COUNTER STARTS AT 6 AND COUNTS
52              ;                       DOWN FOR EACH REREAD
53              ;       NOTE:   IF STATUS INDICATES TAPE ERR (BIT @=1)
54              ;               THE CONTENTS OF AC@,1,AND 2 SHOULD BE IGNORED.
55              ;
```

```
10007 MPRTS
01              ;
02              ;5.3.6  CASSETTE TAPE TEST
03              ;               AC0     GOOD DATA
04              ;               AC1     BAD DATA
05              ;               AC2     ADRS OF BAD DATA (GOOD IS AT AC2-4)
06              ;       IN ADDITION THE FOLLOWING LOC'S ARE TYPED
07              ;               MODE    0=REWIND 1=WRITE 2=BACKSPACE OR READ
08              ;               STATUS  LAST TAPE STATUS
09              ;               CA,EK   ERROR COUNTER STARTS AT 6 AND COUNTS
10              ;                       DOWN FOR EACH REREAD
11              ;       NOTE:   IF STATUS INDICATES TAPE ERR (BIT 0=1)
12              ;               THE CONTENTS OF AC0,1,AND 2 SHOULD BE IGNORED.
13              ;
14              ;5.3.7  MUL/DIV TEST
15              ;               MULTIPLY DIVIDE FAILURES WILL INDICATE
16              ;               EITHER MUL FOR MULTIPLY OR DIV FOR DIVIDE.
17              ;               IN ADDITION, THREE SETS OF AC'S ARE TYPED
18              ;               ORIGINAL OPERANDS
19              ;               HARDWARE RESULT  (ASSUMED TO BE INCORRECT)
20              ;               SOFTWARE RESULT  (ASSUMED TO BE CORRECT)
21              ;
22              ;5.3.8  LINE PRINTER
23              ;               NO ERROR TYPEOUTS.
24              ;               THE PRINTER PATTERN IS THE SAME AS THE
25              ;               TELETYPE TEST WITH 10 TO 60 LINES
26              ;               PER PAGE,  PRINTED WITH RANDOM STALLS
27              ;               BETWEEN EVERY 1 TO 10 LINES
28              ;               PRINTER OUTPUT MUST BE EXAMINED VISUALLY.
29              ;
```

```
10008 MPRTS
01              ;5.3.9  FLOATING POINT TEST
02              ;               AC0     GOOD DATA
03              ;               AC1     BAD DATA
04              ;               AC2     ADRS OF GOOD DATA DURING TEST EXECUTION
05              ;       IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
06              ;               FP,LC   START OF LOCATIONS INCLUDING CURRENT
07              ;                       TEST THAT IS IN SCRATCH(SEE FP,EN)
08              ;               FP,LO   SCRLO AFTER REMAPPING FOR EXECUTION
09              ;               FP,EN   END OF TEST OR START OF RANDOM
10              ;                        DATA IN SCRATCH AREA
11              ;               FPS03   AC3 AT TIME OF ERROR CALL (ADRS OF JSR)
12              ;               FP,LP   LOGICAL PAGE SCRATCH IS REMAPPED
13              ;                       TO FOR TEST EXECUTION
14              ;
15              ;               FP,ES   =-1 FIRST ERROR =0 FOR ALL SUCCEEDING ER
16              ;               FP,HI   SCRHI AFTER TEST IS REMAPPED FOR EXEC.
17              ;               FP,BG   START ADRS OF TEST THAT CORRELATES TO LI
18              ;               FP,GA   START OF TEST AFTER REMAP FOR EXECUTION
19              ;               L ADRS  ADRS OF DATA IN AC2 AFTER REMAPPING
20              ;               DATA    THE DATA IN THAT LOCATION
21              ;               S ADRS  L ADRS IN RELATION TO SCRLO BEFORE REMAP
22              ;
23              ;                       OR IS AT AC2 +MM,SA IF IT IS =0 OR 1
24              ;
25              ;5.3.10 I/O OR VALIDITY  TRAP
26              ;       DEFER OR WRITE CHECK TRAP
27              ;               THE AC'S TYPED AFTER THE PROGRAM #
28              ;               ARE ASSOCIATED WITH THE ILLEGAL TRAP
29              ;               AND INDICATE THE FOLLOWING
30              ;               AC0  DIA 0,MAP   ADDRESS OF INST TRAPED
31              ;               AC1      DIB 1,MAP       LOC. CAUSING TRAP
32              ;               AC2      DIC 2,MAP       MAP STATUS REG.
33              ;               OTHER INFORMATION (AC'S AND CARRY) INDICATE
34              ;               THE CONTENTS OF THOSE REGISTERS AT THE
35              ;               TIME THE ILLEGAL TRAP OCCURED.
36              ;
37              ;5.3.11 INTERRUPT WAIT ELAPSED
38              ;               AN I/O DEVICE WENT MORE THAN 2 MINUTES
39              ;               WITH NO INTERRUPT
40              ;
41              ;6.2    PROGRAM INITIALIZE
42              ;               THE DIAGNOSTIC LINKER INITIALIZES ITSELF
43              ;               AND INDIVIDUAL TESTS IN THE FOLLOWING
44              ;               SEQUENCE:
45              ;                  1. SYSTEM IS RESET, MAP OPTION IS
46              ;                     DETERMINED TO EXIST OR NOT EXIST
47              ;                     AND SWITCHES ARE SET UP
48              ;                     ACCORDINGLY
49              ;                  2. ANY OTHER NECESSARY CONSTANTS
50              ;                        ARE INITIALIZED
51              ;                     (MEM ALLOCATION TABLES)
52              ;                  3. INTERRUPT VECTOR TABLES ARE SET UP TO
53              ;                     PROCESS UNEXPECTED DEVICE INTERRUPTS
54              ;                  4. MEMORY IS SIZED IN 1K INCREMENTS
55              ;                     FROM 0 TO 128K AND BUILDS AN 8 WORD
56              ;                     BIT MAP OF EXISTING CONTIGUOUS
57              ;                     MEMORY
58              ;
59
```

```
10009 MPRTS
01                ;                   5. THE EXIST MAP IS MOVED TO THE
02                ;                      AVAILABLE MAP AND EACH BIT
03                ;                      CORRESPONDING TO 1K OF UITILIZED
04                ;                      MEMORY IS REMOVED FROM THE MAP
05                ;                      SO THAT IT WILL NOT BE ASSIGNED
06                ;                      AS A SCRATCH AREA TO ANY TEST.
07                ;                      (INCLUDES PROGRAM STORAGE, MEMORY ALLOC.
08                ;                      TABLES, INTERRUPT MASKS AND STACK AREA AND
09                ;                      THE LAST 1K OF MEMORY TO PRESERVE THE
10                ;                      BINARY LOADER)
11                ;                   6. EACH TEST IS ENTERED IN SEQUENCE AT ITS
12                ;                      INIT. ENTRY POINT. OPTION TESTS DETERMINE
13                ;                      IF THE DEVICE THEY ARE ASSOC. WITH EXISTS
14                ;                      OR NOT AND PASS INTERRUPT SERVICE PARAM'S
15                ;                      TO THE LINKER.
16                ;                         (DEV#, MASK AND INTERRUPT SERVICE
17                ;                      ADDRESS)
18                ;                   7. LINKER THEN TYPES THE SYSTEM SIZE
19                ;                      INFORMATION ALONG WITH THE PROGRAM
20                ;                      RUN LIST AND WILL ALLOW THE OPERATOR
21                ;                      TO SELECT OR DELETE SPECIFIC TESTS
22                ;                      IF START WAS 00004.
23                ;
24                ;
25                ;6.3    PROGRAM RUN
26                ;                   ONCE THE LINKER HAS COMPLETED ALL
27                ;                   INITIALIZATION THE FOLLOWING SERIES
28                ;                   OF OPERATIONS IS LOOPED THROUGH
29                ;
30                ;
31                ;                      1. LINKER RANDOMLY SELECTS ONE OF
32                ;                         THE INDIVIDUAL TESTS UNTIL IT
33                ;                         FINDS ONE THAT IS NOT WAITING
34                ;                         FOR INTERRUPT (WAIT IS BIT 0 OF
35                ;                         THE THIRD WORD IN TEST+1) AND THAT
36                ;                         THE NEXT RANDOM NUMBER FALLS WITHIN
37                ;                         ITS ENTER LIMITS
38                ;
39                ;                      2. IF THE MAP OPTION EXISTS, ALL LOGICAL PAGE
40                ;                         EXCEPT PAGE 0 ARE ACCESS PROTECTED WITH
41                ;                         THE PHYSICAL AREA OF THE SELECTED TEST
42                ;                         MAPPED TO ITSELF AND ANY ASSIGNED
43                ;                         SCRATCH AREA MAPPED TO START AT 1K
44                ;                         ABOVE THE TEST, MEMORY LOCATIONS ACRLO
45                ;                         AND SCRHI (SCRATCH LOW AND HIGH) ARE
46                ;                         SET TO INDICATE THE LIMITS OF
47                ;                         THE SCRATCH AREA AVAILABLE TO THE TEST.
48                ;
49                ;                      3. DATA CHANNEL LIMITS (DCHLO AND DCHHI)
50                ;                         ARE CALCULATED AND ENTERED
51                ;
52                ;                      4. THE SELECTED TEST IS ENTERED AT
53                ;                         ITS SPECIFIED EXECUTE ENTRY POINT
54                ;
55                ;
56                ;
57                ;
58                ;
59                ;
```

```
10010 MPRTS
01
                              .TITL   LINKR
03                ;DIAGNOSTIC PROGRAM LINKER
04                ;CONCURRENTLY LINK A VARIETY OF PROC,
05                ;AND I/O TESTS VIA RANDOM SELECTION
06          000002 .OUSR MAP=2
07                ;INTERNAL DEFS TO LINK FOR DEBUG
08          000002          .LOC 2
09 00002 002003 STRT1:  JMP .,+1        ;SIZE AND GO
10 00003 001010          LINKR
11 00004 002005 STRT2:  JMP .,+1        ;SIZE AND WAIT FOR SELECTIONS
12 00005 001011          LINKR+1
13                ;PAGE 0 LINKS FOR MAP OPTION TRAPS
14          000050          .LOC 50
15 00050 003523 IIOVL:  IOVAL   ;I/O VALIDITY TRAP
16 00051 003573 IDWCK:  DWCHK   ;DEFER OR WRITE CHECK
17 00052 002101 ICDIS:  CDISP   ;CALL DISPATCH
18                ;PAGE 0 LINKS FOR CALLS
19                ;ASCRA MUST BE FIRST WITH RDMAP LAST
20                ;ANY CALL EXPANSION MUST BE MADE BETWEEN THE TWO
21 00053 002441 ASCRA:  ASSCR   ;ASSIGN SCRATCH
22 00054 002470 ESCRA:  EXSCR   ;EXPAND SCRATCH
23 00055 002517 RSCRA:  RLSCR   ;RELEASE SCRATCH
24 00056 002547 GSCRA:  GOSCR
25 00057 003161 PDECI:  PDEC    ;DECIMAL PRINT
26 00060 003107 ERRTX:  ERTXT   ;TEXT TYPEOUT CALL
27 00061 001573 RETRN:  LRETP   ;RETURN FROM TEST
28 00062 001621 ARANG:  RANGN   ;RANDOM # GENERATOR
29 00063 001742 ADIVI:  DIVID   ;INTEGR UNSIGNED DIV
30 00064 003447 EINTS:  EINTP   ;ENTER INTR SERVICE
31 00065 002746 ERROI:  ERROH   ;INIT ERROR TYPEOUTS
32 00066 003064 ERROC:  ERROE   ;APPEND TO ERR TYPEOUT
33 00067 002676 SETUL:  SETLP   ;SET UP STRT OF LOOP
34 00070 002716 LLOOP:  LOOPL   ;LOOP BACK TO SETUP
35 00071 001667 FRANG:  RANG3   ;RAN #'S TO AC'S 0,1,AND 2
36 00072 002617 ERRET:  ERRRT   ;2ND LEVEL ERR RETURN
37 00073 002640 RETU2:  RETN2   ;2ND LEVEL NO ERR RETURN
38 00074 003775 ADMAP:  AMSCR   ;ASSIGN SCR TO A DCH
39 00075 004060 EDMAP:  EMSCR   ;EXPAND DATA CHANNEL ASSIGN
40 00076 004132 RDMAP:  RDSCR   ;RELEASE DCH MAP
41                ;TEST PARAMETER LOCATIONS
42 00077 000000 MPSWT:  0       ;MAP EXIST SWITCH
43 00100 000000 ALTBL:  0       ;ADRS MEM ALLOCATION TABLES
44 00101 000000 PSTRT:  0       ;FIRST LOC OF TST
45 00102 000000 PENDA:  0       ;LAST LOC
46 00103 000000 RTTIM:  0       ;ELAPSED RUNTIME IN MINUTES
47 00104 177777 TIMSW:  -1      ;=0 IT'S TIME TO PRINT
48 00105 000000 ERTOT:  0       ;ERROR ACCUMULATOR
49                ;SCRATCH AREA SIZE PARAMETER LOCS FOR TEST USAGE
50 00106 000000 SCRLO:  0       ;LOWEST LOGICAL SCRATCH ADRS
51 00107 000000 SCRHI:  0       ;HIGHEST LOGICAL SCRATCH ADRS
52 00110 000000 DCHLO:  0       ;LOW LOG DCH ADRS
53 00111 000000 DCHHI:  0       ;HIGH LOG DCH ADRS
54          000112 LZMAX=DCHHI+1
55          000112 LPG0=.
```

```
10011 MPRTS
01
02                ;DEFINITIONS FOR USER STATUS TABLE ACCESS
03        001001 USTZM=1001
04        001002 USTSS=1002
05        001003 USTES=1003
06        001004 USTNM=1004
07                ;
08                ;LINKER MAIN LINE DISPATCH ROUTINE
09        001010          .LOC 1010
10 01010 102401 LINKR:  SUB 0,0,SKP       ;AUTO START ENTRY
11 01011 102000         ADC 0,0           ;MANUAL SELECT ENTRY
12 01012 040414         STA 0,LAUTO       ;SET ENTRY TYPE SW
13 01013 004404         JSR LDSPR         ;START DISPATCH
14 01014 001027         LTBL1   ;THROUGH INIT SEQ
15 01015 004402 LRUNS:  JSR LDSPR
16 01016 001043         LTBL2   ;THROUGH RUN TABLE
17                ;DISPATCH ROUTINE
18                ;ENTER SUBROUTINES IN SEQ VIA TABLE SPEC BY (R3)
19                ;END OF EACH TABLE IS LRUNS WHICH WILL START US
20                ;BACK AT THE BEGINNING OF THE RUN TABLE
21 01017 021400 LDSPR:  LDA 0,0,3         ;ADRS OF DISPATCH TABLE
22 01020 040405         STA 0,LIDIS
23 01021 036404 LDS.1:  LDA 3,@LIDIS
24 01022 005400         JSR 0,3
25 01023 010402         ISZ LIDIS
26 01024 000775         JMP LDS.1
27 01025 000000 LIDIS: 0
28 01026 000000 LAUTO: 0
29                ;DEFINE SYSTEM MACROS FOR INDIVIDUAL TESTS
30                        .MACRO LCALL
31                        NIOC MAP
32                        JSR @A1
33                %
34                        .MACRO NEXTT
35                LMEML=.
36                        .LOC LPG0
37                        A1
38                LPG0=.
39                        .LOC LMEML
40                        0       ;INTERRUPT TIMEOUT SWITCH
41                %
```

```
10012 MPRTS
01
02                ;LTBL1=INIT SYSTEM DISPATCH TABLE
03                ;END OF TABLE IS LRUNS
04 01027 001054 LTBL1:  LSYSR   ;RESET SYS
05 01030 001212         GPRGK   ;GET # TESTS LOADED
06 01031 001123         LWSET   ;SET UP RUNNING CONS.
07 01032 003460         LCINT   ;INIT INTR VECTORS
08 01033 001225         LSIZE   ;SIZE MEMORY
09 01034 001350         MVETA   ;MOVE EXISM TO AVAIL
10 01035 001367         UPL32   ;REMOVE USED CORE FROM AVAILM
11 01036 001415         TINIT   ;INIT EACH TEST LOADED
12 01037 004223         LPRSL   ;LISTS TESTS TO BE RUN
13 01040 001015         LRUNS
14 01041 000000         0
15 01042 000000         0
16                ;
17                ;
18                ;LTBL2=RUN SYS DISPATCH TABLE
19 01043 001437 LTBL2:  LRANP   ;RANDOM PROG SELECT
20 01044 002314         LDMAP   ;LOAD MAP OPTION
21 01045 004203         LDCHL   ;CALC DCHLO/HI
22 01046 001555         LSTRP   ;START TEST RUNNING
23 01047 001053         LSTAT   ;ADJUST RUN STATISTICA
24 01050 001015         LRUNS
25 01051 000000         0
26 01052 000000         0
27 01053 001400 LSTAT:  JMP 0,3
```

```
10013 MPRTS
01
02                ;LSYSR=RESET SYSTEM
03                ;SET LOGICAL PAGE 37=PHYS 37
04                ;SET MPSWT=0 NO MAP  =1'S IF MAP OPTION
05                ;SET PROCERROR PROTECT BIT
06                ;0 ALL OTHER PROTECT BITS
07 01054 062677 LSYSR:  IORST
08 01055 102400         SUB 0,0
09 01056 040105         STA 0,ERTOT     ;CLR ACCUM ERRS
10 01057 020427         LDA     0,LS,K1
11 01060 061002         DOA     0,MAP
12 01061 102400         SUB     0,0
13 01062 040000         STA     0,0
14 01063 040077         STA     0,MPSWT ;CLEAR MAP EXIST SWITCH
15 01064 026423         LDA     1,@LS,K2        ;IF MAP GET(0)
16 01065 125004         MOV     1,1,SZR ;SKP MAYBE MAP
17 01066 001400         JMP     0,3     ;EXIT NO MAPPING
18 01067 012420         ISZ     @LS,K2
19 01070 020000         LDA     0,0     ;(0)=+1 IF MAP OPT
20 01071 046416         STA     1,@LS,K2
21 01072 100405         NEG     0,0,SNR ;SKIP IF MAP
22 01073 001400         JMP     0,3     ;EXIT NO MAPPING
23 01074 040077         STA     0,MPSWT
24 01075 024413         LDA     1,LS,K3
25 01076 065002         DOA     1,MAP   ;MAP 37 TO 37
26 01077 030412         LDA     2,LS,K4
27 01100 025000 LSYS1:  LDA 1,0,2       ;GET NEXT PROTECT #
28 01101 125005         MOV 1,1,SNR     ;=0 IS END OF PROTCT
29 01102 001400         JMP 0,3         ;INIT JOB IS DONE
30 01103 065002         DOA     1,MAP   ;PROTECT PROCESSOR
31 01104 151400         INC 2,2
32 01105 000773         JMP LSYS1       ;DO NEXT PRTCT MAP
33 01106 017400 LS,K1: 17400
34 01107 076000 LS,K2: 76000
35 01110 017437 LS,K3: 17437
36 01111 001112 LS,K4:  .+1
37 01112 040277         277+40000
38 01113 040466         466+40000
39 01114 041137         1137+40000
40 01115 041747         1747+40000
41 01116 042377         2377+40000
42 01117 042777         2777+40000
43 01120 043377         3377+40000
44 01121 043760         3760+40000
45 01122 000000         0       ;END OF PROTECT MASK TABLE
46                ;ABOVE SEQUENCE PROTECTS AGAINST ACCESS TO
47                ;UN USED DEVICES
48                ;USED DEVICES INCLUDE 20,33,74,75,76,22,14,10,11,34
49                ;17,AND 1
```

```
10014 MPRTS
01
02                ;LWSET=SET UP SYSTEM FOR RUNNING
03                ;DCHMAP AND INIT MAP OPTION TRAP LOCATIONS
04 01123 022450 LWSET:  LDA 0,@LW,K1    ;GET NMAX
05 01124 040464         STA 0,LSYTB
06 01125 040464         STA 0,LSETB
07 01126 024476         LDA 1,PROGK
08 01127 124400         NEG 1,1
09 01130 044446         STA 1,LW,C1
10 01131 030460 LWS,1:  LDA 2,LSETB
11 01132 102400         SUB 0,0
12 01133 041000         STA 0,0,2       ;SET UP MEM ALLOC
13 01134 151400         INC 2,2 ;TABLES FOR 1 PROG
14 01135 041000         STA 0,0,2       ;1ST 2 WRDS =0
15 01136 151400         INC 2,2         ;NXT 16=+1
16 01137 024440         LDA 1,LW,K4
17 01140 100000         COM 0,0
18 01141 041000 LWS,2:  STA 0,0,2
19 01142 151400         INC 2,2
20 01143 125404         INC 1,1,SZR     ;STORE =1 16 TIMES
21 01144 000775         JMP LWS,2
22 01145 050444         STA 2,LSETB     ;NEW END SYS TABLES
23 01146 010430         ISZ LW,C1
24 01147 000762         JMP LWS,1       ;DO ONE MORE TABLE
25 01150 042430         STA 0,@LW,K5    ;DCH ALLOC TABLE
26 01151 042430         STA 0,@LW,K5+1  ;AVAILABLE 32K
27 01152 014437         DSZ LSETB       ;REAL END OF SYS TABLES
28 01153 024427         LDA 1,LW,K6
29 01154 030427         LDA 2,LW,K7
30 01155 100000         COM 0,0
31 01156 041000 LWS,3:  STA 0,0,2       ;CLEAR CORE WXIST MAP
32 01157 151400         INC 2,2
33 01160 125404         INC 1,1,SZR
34 01161 000775         JMP LWS,3
```

```
10015 MPRTS
01
02                ;NOW SET UP JMP @'S IN MAP TRAPS
03 01162 024423           LDA 1,MP,K1
04 01163 044040           STA 1,40          ;I/O VALIDITY
05 01164 024422           LDA 1,MP,K2       ;
06 01165 044041           STA 1,41          ;DEFER WRITE
07 01166 024421           LDA 1,MP,K3
08 01167 044042           STA 1,42          ;SUPERVISOR CALL
09 01170 020414           LDA 0,LW,K8
10 01171 061002           DOA 0,MAP         ;TURN ALL PROTECT ON
11 01172 001400           JMP 0,3
12 01173 001004 LW,K1:  USTNM
13 01174 001002 LW,K2:  USTSS
14 01175 001003 LW,K3:  USTES
15 01176 000000 LW,C1:  0
16 01177 177760 LW,K4:  -16.
17 01200 015120 LW,K5:  DCHM0
18 01201 015121           DCHM1
19 01202 177770 LW,K6:  -8.
20 01203 015100 LW,K7:  EXISM
21 01204 176000 LW,K8:  176000
22 01205 002050 MP,K1:   JMP @IIOVL
23 01206 002051 MP,K2:   JMP @IDWCK
24 01207 002052 MP,K3:   JMP @ICDIS
25 01210 000000 LSYTB:  0
26 01211 000000 LSETB:  0
27
28
29                ;GPRGK=GENERATE PROGRAM COUNT
30                ;THE FOLLOWING SUBROUTINE SIMPLY DETERMINES
31                ;HOW MANY TEST PROGRAMS ARE IN CORE
32                ;ALONG WITH THE DIAGNOSTIC LINKER
33                ;ZMAX=LAST LINKER ZLOC=#TESTS INTO PROGK
34 01212 024410 GPRGK:  LDA     1,KLZMX ;LAST LINKER ZLOC
35 01213 022410           LDA     0,@ISTZM          ;LAST ZPAGE FILLED
36 01214 111000           MOV     0,2
37 01215 122400           SUB     1,0       ;AC0=NEMBER TESTS
38 01216 040406           STA     0,PROGK
39 01217 102400           SUB     0,0
40 01220 041000           STA     0,0,2
41 01221 001400           JMP     0,3
42 01222 000112 KLZMX:  LZMAX
43 01223 001001 ISTZM:  USTZM
44 01224 000000 PROGK:  0
```

```
10016 MPRTS
01
02                ;LSIZE=LINK THE 32K AND 128K MEM SIZERS
03                ;SET UP UP32L AND HIGHK
04                ;EXISTM=0'S
05 01225 004421 LSIZE:  STA     3,LS,S3
06 01226 004423           JSR     MSZ32     ;SIZE 0 TO 32K
07 01227 040420           STA     0,UP32L ;AC0=LAST ADRS IN 32K
08 01230 024657           LDA     1,LS,K2 ;5 BITS PHYS PAGE 37
09 01231 107400           AND     0,1
10 01232 125300           MOVS    1,1       ;AC1=LAST PHYS PAGE(32K)
11 01233 125220           MOVZR   1,1
12 01234 125220           MOVZR   1,1
13 01235 044413           STA     1,HIGHK ;IN CASE NOT 32K OR NO MAP
14 01236 101533           INCZL#  0,0,SNC ;SKP IS 32K
15 01237 002407           JMP     @LS,S3  ;EXIT MEM <32K
16 01240 024077           LDA     1,MPSWT
17 01241 125005           MOV     1,1,SNR ;=0 IS NO MAP OPTION
18 01242 002404           JMP     @LS,S3
19 01243 004447           JSR     MS128     ;SIZE 32K TO 128K
20 01244 040404           STA     0,HIGHK ;# OF PHYS PAGES(1K)
21 01245 002401           JMP     @LS,S3
22 01246 000000 LS,S3:  0
23 01247 000000 UP32L:  0
24 01250 000000 HIGHK:  0
```

```
10017 MPRTS
01
02                ;MSZ32=MEMORY SIZER 32K
03                ;DOES NOT USE MAP OPTION
04                ;SETS EXIST BIT FOR CONTIGUOS MEM TO 32K
05                ;WILL NOT SIZE NNN CONTIGUOS MEM
06                ;ALSO ASSUMES THAT EXISM=0'S
07                ;I.E.=CMAPB SSKIP ON RETURN IS NONSENSE
08                ;SIZES IN 1K INCR EXIT AC0=HIGHEST AVAIL ADRS.
09                ;
10 01251 054435 MSZ32:  STA     3,XMS32 ;SAVE
11 01252 126400         SUB     1,1     ;0FOR FIRST 1K
12 01253 030431         LDA     2,K1K   ;1777 FOR END OF 1K
13 01254 133000         ADD     1,2     ;+CURRENT 1K FIELD
14 01255 025000         LDA     1,0,2   ;GET CELL
15 01256 120000         COM     1,0     ;CHNG BITS
16 01257 041000         STA     0,0,2
17 01260 021000         LDA     0,0,2   ;=COM MEM EXISTS
18 01261 122405         SUB     1,0,SNR ;AND WE'LL SKIP
19 01262 000420         JMP     M32SZ   ;LST WAS NONEXIST
20 01263 050422         STA     2,M32TEM
21 01264 045000         STA     1,0,2   ;RESTORE CELL
22 01265 141300         MOVS    2,0
23 01266 101200         MOVR    0,0
24 01267 101200         MOVR    0,0
25 01270 024417         LDA     1,K37
26 01271 123400         AND     1,0     ;AC0=PHYS PAGE #
27 01272 030416         LDA     2,KXIST ;ADRS EXIST TABLE
28 01273 006416         JSR     @MS.L1  ;SET EXIST BIT=1
29 01274 101001         MOV     0,0,SKP
30 01275 063077         HALT    ;*****CAN'T HAPPEN EXIST BIT HAD TO =0
31 01276 024407         LDA     1,M32TE ;AC1=LAST 1K TOP ADDRESS
32 01277 125400         INC     1,1
33 01300 125133         MOVZL#  1,1,SNC ;SKP IF LAST CELL =32K
34 01301 000752         JMP     MSZ32+2 ;NOT DONE SIZING
35 01302 020403 M32SZ:  LDA     0,M32TE ;AC0=HIGHEST AVAIL.
36 01303 002403         JMP     @XMS32
37 01304 001777 K1K:  1777
38 01305 000000 M32TE:  0
39 01306 000000 XMS32:  0
40 01307 000037 K37:  37
41 01310 015100 KXIST:  EXISM
42 01311 002037 MS.L1:  CMAPB
```

```
10018 MPRTS
01
02                ;MS128=MEMORY SIZING FROM 32 TO 128K
03                ;MAP OPTION MUST EXIST
04                ;USES LOG PGE37 ALWAYS MAPPED TO SIZE
05                ;EXIT IS WITH AC0=LAST PHYSICAL PAGE#
06                ;EXISM(EXIST MAP) MUST =0'S ABOVE 32K
07                ;ASSUMES MEMORY TO BE CONTIGUOS
08 01312 054774 MS128:  STA     3,XMS32
09 01313 020735         LDA     0,HIGHK
10 01314 101400         INC     0,0
11 01315 105300         MOVS    0,1
12 01316 125122         MOVZL   1,1,SZC ;CARRY=1 IS SIZED TO 128
13 01317 000421         JMP     M128S
14 01320 034427         LDA     3,MPF32 ;BITS FOR 32K MAP
15 01321 117000         ADD     0,3     ;+PHYS PAGE #
16 01322 075002         DOA     3,MAP
17 01323 032423         LDA     2,@K32K ;GET CELL
18 01324 154000         COM     2,3
19 01325 056421         STA     3,@K32K
20 01326 036420         LDA     3,@K32K
21 01327 052417         STA     2,@K32K
22 01330 156405         SUB     2,3,SNR ;SKIP IS CELL EXISTS
23 01331 000407         JMP     M128S   ;MEM IS SIZED
24 01332 040716         STA     0,HIGHK ;SAVE NEW TOP MEM
25 01333 030755         LDA     2,KXIST ;EXIST MAP
26 01334 006755         JSR     @MS.L1  ;SET EXIST BIT
27 01335 101001         MOV     0,0,SKP ;HAD TO GO 0=1
28 01336 063077         HALT    ;**BIT HAD TO =0 CMAPB GOOF
29 01337 000754         JMP     MS128+1
30 01340 020710 M128S:  LDA     0,HIGHK
31 01341 024746         LDA     1,K37
32 01342 131300         MOVS    1,2
33 01343 133000         ADD     1,2
34 01344 071002         DOA     2,MAP
35 01345 002741         JMP     @XMS32
36 01346 077777 K32K:  77777
37 01347 017400 MPF32:  17400
```

```
;0019 MPRTS
01                ;MVETA-MOVE THE EXIST MAP
02                ;INT THE AVAILABLE MAP POSITION
03 01350 054413 MVETA:  STA     3,XMVET
04 01351 030413         LDA     2,KEXMP ;A2=STR EXIST
05 01352 034413         LDA     3,KAVMP ;A3=STR AVAILABLE
06 01353 024413         LDA     1,KM8   ;=8 FOR COUNTING
07 01354 021000         LDA     0,0,2   ;WORD
08 01355 041400         STA     0,0,3   ;TO WORD
09 01356 151400         INC     2,2
10 01357 175400         INC     3,3
11 01360 125404         INC     1,1,SZR ;SKP IS DONE 8
12 01361 000773         JMP     .-5
13 01362 002401         JMP     @XMVET  ;
14 01363 001350 XMVET: MVETA
15 01364 015100 KEXMP: EXISM
16 01365 015110 KAVMP: AVALM
17 01366 177770 KM8:   -8.
18                ;UBL32-SET UP USLABLE SCRATCH LIMITS  IN 32K
19                ;ALL CORE ABOVE 32K IS ASSUMED TO BE USEABLE SCRATCH
20                ;CLEAR AVAILABLE BITS FOR THOSE AREAS USED
21                ;SO THAT THEY WILL NOT BE ASSIGNED AS A SCRATCH AREA
22                ;TO ANY TEST
23                ;SUBR CBLIM IS USED TO CLEAR AVAILABLE BITS
24 01367 054416 UBL32:  STA     3,XUBL3 ;SAVE RETURN
25 01370 102400         SUB     0,0
26 01371 026415         LDA     1,@KNMAX        ;0 TO NMAX
27 01372 006422         JSR     @UBLIM  ;PROTECTS PROGRAMS
28 01373 022414         LDA     0,@KUP32        ;LAST ADRS IN 32K
29 01374 105000         MOV     0,1
30 01375 006417         JSR     @UBLIM  ;PROTECTS LOADER
31 01376 026412         LDA     1,@KSTSS        ;STRT SYMBOLS
32 01377 022412         LDA     0,@KSTES        ;END SYMBOLS
33 01400 006414         JSR     @UBLIM  ;PROTECTS SYMBOLS
34 01401 022411         LDA     0,@KLSTB        ;STRT LINKER TABLES
35 01402 026411         LDA     1,@KLETB        ;END LINKER TABLES
36 01403 006411         JSR     @UBLIM  ;PROTECTS LINKER TABLES
37 01404 002401         JMP     @XUBL3  ;RETURN
38 01405 000000 XUBL3:  0
39 01406 001004 KNMAX:  USTNM
40 01407 001247 KUP32:  UP32L
41 01410 001002 KSTSS:  USTSS
42 01411 001003 KSTES:  USTES
43 01412 001210 KLSTB:  LSYTB
44 01413 001211 KLETB:  LSETB
45 01414 001757 UBLIM:  CBLIM
```

```
;0020 MPRTS
01
02                ;TINIT-TEST INITIALIZE
03                ;SEQUENCE THROUGH THE INITIALIZE ADDRESSES
04                ;FOR EACH TEST LOADED ALONG WITH LINKER
05                ;1 POINTER FOR  EACH TESTS PARAMETERS
06                ;IS IN ALL USED LOCATIONS ABOVE ZLOC
07 01415 054420 TINIT:  STA     3,XTINI
08 01416 102400         SUB     0,0
09 01417 040417         STA     0,NPROG ;PROG TO INIT
10 01420 024404         LDA     1,PROGK
11 01421 034415         LDA     3,NPROG ;NEXT PROG TO INIT
12 01422 166415         SUBM    3,1,SNR ;SKP IS NOT DONE ALL
13 01423 002412         JMP     @XTINI  ;EXIT ALL PROGS INITED
14 01424 022521         LDA     0,LP,K1
15 01425 117000         ADD     0,3
16 01426 031400         LDA     2,0,3   ;GET INIT ADRS
17 01427 102400         SUB     0,0
18 01430 041377         STA 0,-1,2      ;CLR INTA ELAPSED TIME
19 01431 041002         STA 0,2,2       ;CLEAR WAIT INT SW
20 01432 007000         JSR     @0,2    ;AND INIT THIS TEST
21 01433 010403         ISZ     NPROG   ;STEP TO NXT PROG
22 01434 000764         JMP     TINIT+3 ;AND DO AGN
23 01435 000000 XTINI:  0
24 01436 000000 NPROG:  0
25
26
27
```

```
10021 MPRTS
01
02                ;LRANP=RANDOMLY SELECT A PROGRAM
03                ;SCAN WAITING FOR INTERRUPT SWITCHES FOR INTR DONE
04                ;ENTER ANY TEST COMPLETED INTA
05                ;IF NONE ENTER RANDOM SELECT MODE
06                ;IF TEST SELECTED IS WAITING INTA SELECT ANOTHER
07                ;GENERATE A 2ND NUMBER CHECK TO
08                ;SEE IF IT IS BETWEEN THE ENTRY LIMITS SPEC
09                ;IF SO ENTER PROGRAM IF NOT SELECT ANOTHER TEST
10 01437 054510 LRANP:  STA 3,LR,S3
11 01440 102400         SUB 0,0
12 01441 030504         LDA 2,LP,K1       ;START OF TEST LINKS
13 01442 035000 LPRL1:  LDA 3,0,2         ;GET TEST LINK
14 01443 175005         MOV 3,3,SNR       ;SKP IS TEST EXISTS
15 01444 000433         JMP LPRL2         ;NO ONE INTR DONE USE RAN
16 01445 025402         LDA 1,2,3         ;GET INTR SW
17 01446 125005         MOV 1,1,SNR       ;WAITING INT OR DISABLED?
18 01447 000425         JMP LPS1E         ;NO TRY NEXT TEST
19 01450 125103         MOVL 1,1,SNC      ;SKP=WAIT BIT STILL ON
20 01451 000432         JMP LPRGO         ;ENTER THIS TEST
21 01452 025777         LDA 1,-1,3        ;GET INTA ELAPSED TIMER
22 01453 125005         MOV 1,1,SNR       ;SKP IF ACTIVE
23 01454 000420         JMP LPS1E
24 01455 034103         LDA 3,RTTIM       ;GET CUR RUN TIME
25 01456 166414         SUB# 3,1,SZR      ;SKP=RUN TIME ERR
26 01457 000415         JMP LPS1E
27 01460 040466         STA 0,CURPR
28 01461 006472         JSR @LPMES        ;TIME ELAPSED MESS.
29 01462 001576         LP,TX
30 01463 024463         LDA 1,CURPR       ;PRINT PROG#
31 01464 006470         JSR @LP,ZOC
32 01465 035000         LDA 3,0,2
33 01466 102400         SUB 0,0
34 01467 041777         STA 0,-1,3
35 01470 040104         STA 0,TIMSW       ;FORCE TIME TYPE
36 01471 010105         ISZ ERTOT
37 01472 000401         JMP .+1
38 01473 000745         JMP LRANP+1
39 01474 101400 LPS1E:  INC 0,0
40 01475 151400         INC 2,2
41 01476 000744         JMP LPRL1         ;TRY NEXT TEST
42                ;NO TEST WAITING TO PROCESS INTERRUPT RANDOM SELECT
43 01477 006062 LPRL2:  JSR @ARAND
44 01500 105000         MOV 0,1
45 01501 032447         LDA 2,@LROGK      ;DIV RAN/#PROGS
46 01502 006063         JSR @ADIVI
```

```
10022 MPRTS
01                ;SEE IF NEXT RAN# FITS BETWEEN TEST ENTER LIMITS
02                ;BUT DO NOT ENTER TEST IF IT IS WAITING INTA
03 01503 040443 LPRGO:  STA 0,CURPR       ;CURRENT PROG #
04 01504 030441         LDA 2,LP,K1       ;LAST LINKR ZLOC+1
05 01505 113000         ADD 0,2           ;A2=PNTR TO PARAM ADRS
06 01506 035000         LDA 3,0,2
07 01507 054101         STA 3,PSTRT       ;START ADDRES OF PRG
08 01510 031001         LDA 2,1,2         ;GET STRT NXT PROG
09 01511 151005         MOV 2,2,SNR       ;=0 IS LAST PRG SEL
10 01512 032437         LDA 2,@LW,K9      ;AND WE USE NMAX
11 01513 050102         STA 2,PENDA       ;AS THE END OF PROG
12 01514 014102         DSZ PENDA         ;=1 FOR REAL END OF PROG
13 01515 031402         LDA 2,2,3
14 01516 151132         MOVZL# 2,2,SZC    ;C=1 IS WAITING INTR
15 01517 000760         JMP LPRL2         ;SELECT DIFF PROG
16                ;IF ACS3=1 DELETE ALL RANDOM SELECT DELAYS
17 01520 074477         READS 3
18 01521 177100         ADDL 3,3
19 01522 177102         ADDL 3,3,SZC
20 01523 000411         JMP LPRGA         ;DELETE DELAYS=1
21 01524 006062         JSR @ARAND        ;GET NEW RANDOM
22 01525 034101         LDA 3,PSTRT
23 01526 025403         LDA 1,3,3         ;GET PRG LWR LIMIT
24 01527 122433         SUBZ# 1,0,SNC
25 01530 000747         JMP LPRL2
26 01531 025404         LDA 1,4,3         ;GET HIGH LIMIT
27 01532 122032         ADCZ# 1,0,SZC
28 01533 000744         JMP LPRL2
29 01534 020412 LPRGA:  LDA 0,CURPR       ;PROGRAM #
30 01535 103020         ADDZ 0,0          ;*2
31 01536 105120         MOVZL 0,1         ;*4
32 01537 127120         ADDZL 1,1         ;*16
33 01540 107000         ADD 0,1           ;*18
34 01541 022411         LDA 0,@XSYTB      ;*START OF SYS TABLES
35 01542 123000         ADD 1,0
36 01543 040100         STA 0,ALTBL
37 01544 002403         JMP @LR,S3
38 01545 000112 LR,K1:  LZMAX
39 01546 000000 CURPR:  0
40 01547 000000 LR,S3:  0
41 01550 001224 LROGK:  PROGK
42 01551 001004 LW,K9:  USTNM
43 01552 001210 XSYTB:  LSYTB
44 01553 003122 LPMESS: MESS
45 01554 003154 LP,ZOC: ZOCT
```

```
10023 MPPTS
01
02                ;LSTRP=START PROGRAM
03                ;ENTER TEST SELECTED AT ITS EXECUTION ENTRY POINT
04 01555 054417 LSTRP:  STA 3,L.SS3
05 01556 030101         LDA 2,PSTRT
06 01557 024103         LDA 1,RTTIM
07 01560 125600         INCR 1,1
08 01561 125500         INCL 1,1          ;CURRENT RUNTIME
09 01562 045377         STA 1,-1,2        ;+3 MINUTES WAIT
10 01563 021001         LDA 0,1,2         ;GET EXEC ADRS
11 01564 040411         STA 0,LS.I1
12 01565 025005         LDA 1,5,2         ;GET PROTECT MASK
13 01566 065002         DOA 1,MAP
14 01567 060277         INTDS
15 01570 060102         NIOS MAP          ;TURN USER MADE ON
16 01571 060177         INTEN             ;STALL
17 01572 002403         JMP @LS.I1        ;ENTER TEST
18                ;LRETP=RETURN FROM TEST PROG CALL
19 01573 002401 LRETP:  JMP @L.SS3
20 01574 000000 L.SS3: 0
21 01575 000000 LS.I1: 0
22 01576 005215 LP.TX:  .TXTE (<15><12>INTERRUPT WAIT ELAPSED
23       047311
24       142724
25       151322
26       050125
27       120324
28       040727
29       152311
30       142640
31       040714
32       051520
33       042305
34 01612 005215 <15><12>PROG, NO, (
35       151120
36       043717
37       120056
38       147516
39       120056
40       000000
```

```
10024 MPPTS
01
02                ;RANGN=RANDOM # GENERATOR
03                ;SPIN #'S OUT IN A HURRY FORGET THE MATH
04 01621 044427 RANGN:  STA 1,RN.S1
05 01622 050427         STA 2,RN.S2
06 01623 030430         LDA 2,RN.K1       ;7 FOR MASKING AT 8
07 01624 020430         LDA 0,RN.C2       ;CYCLIC CONSTANT
08 01625 024425         LDA 1,RN.C1
09 01626 133404         AND 1,2,SZR       ;ROTAT C2 EVERY 8
10 01627 010404         JMP RAN.1
11 01630 101122         MOVZL 0,0,SZC
12 01631 101400         INC 0,0
13 01632 040422         STA 0,RN.C2
14 01633 024423 RAN.1:  LDA 1,RTABL
15 01634 133000         ADD 1,2           ;TO GET NXT SUM VAR
16 01635 025000         LDA 1,0,2
17 01636 123000         ADD 1,0
18 01637 041000         STA 0,0,2         ;NEW SUM IN VAR
19 01640 024415         LDA 1,RANNM       ;LAST RAN#
20 01641 123300         ADDS 1,0
21 01642 040413         STA 0,RANNM
22 01643 024405         LDA 1,RN.S1
23 01644 030405         LDA 2,RN.S2
24 01645 010405         ISZ RN.C1
25 01646 001400         JMP 0,3
26 01647 001400         JMP 0,3
27 01650 000000 RN.S1: 0
28 01651 000000 RN.S2: 0
29 01652 000000 RN.C1: 0
30 01653 000007 RN.K1: 7
31 01654 123456 RN.C2: 123456
32 01655 000000 RANNM: 0
33 01656 001657 RTABL: RTABL+1
34 01657 027247         027247
35 01660 145651         145651
36 01661 162724         162724
37 01662 071352         071352
38 01663 034565         034565
39 01664 116272         116272
40 01665 047135         047135
41 01666 113523         113523
42 01667 054407 RANG3:  STA 3,RN.S3       ;FILL AC0 TO 2 WITH RAN #'S
43 01670 004731         JSR RANGN
44 01671 111000         MOV 0,2
45 01672 004727         JSR RANGN
46 01673 105000         MOV 0,1
47 01674 004725         JSR RANGN
48 01675 002401         JMP @RN.S3
49 01676 000000 RN.S3: 0
```

```
10025 MPRTS
01
02                ;RMSEL=RANDOM MAP SELECT
03                ;RANDOMLY SELECT A BIT IN A MAP
04                ;CALL IS MADE:
05                ;       JSR RMSEL
06                ;       TRYPTR          ;POINTS AT MAP SIZE#
07                ;       MAPADRS         ;START OF MAP ADRS
08                ;IF A 1 BIT IS NOT FOUND IN THE MAP
09                ;AFTER A # OF RANDOM TRYS = TO TRYPTR
10                ;A SEQUENTIAL SEARCH OF THE MAP IS MADE
11                ;IF NO 1 BIT EXISTS EXIT IS MADE TO CALL+3
12                ;OTHERWISE EXIT IS TO CALL+4 WITH AC0=BIT#
13                ;THIS ROUTINE IS USED BY ASCRA ESCRA AND ADMAP
14                ;TO SELECT SCRATCH AND DATA CHANNEL ASSIGNMENTS
15 01677 054441 RMSEL:  STA 3,XRMSE
16 01700 023400          LDA 0,@0,3
17 01701 025401          LDA 1,1,3
18 01702 040433          STA 0,RM.P1
19 01703 044433          STA 1,RM.P2
20 01704 100000          COM 0,0
21 01705 040432          STA 0,RM.P3
22 01706 006062 RM.L1:   JSR @ARANG      ;GET RANDOM
23 01707 030426          LDA 2,RM.P1
24 01710 151400          INC 2,2
25 01711 105000          MOV 0,1
26 01712 006063          JSR @ADIVI      ;REM IN AC0=BIT SEL
27 01713 030423          LDA 2,RM.P2
28 01714 006425          JSR @ICMPB      ;SKIP IF BIT =1
29 01715 006424          JSR @ICMPB      ;CHNG IT BK TO 0 SKP
30 01716 000415          JMP RM.FN       ;FOUND 1 EXIT
31 01717 010420          ISZ RM.P3
32 01720 000766          JMP RM.L1
33 01721 020416 RM.L2:   LDA 0,RM.P3     ;GET NXT SEQ BIT
34 01722 006417          JSR @ICMPB      ;SKP IF =1
35 01723 006416          JSR @ICMPB      ;0 BIT AND SKIP
36 01724 000407          JMP RM.FN
37 01725 024410          LDA 1,RM.P1
38 01726 010411          ISZ RM.P3
39 01727 106404          SUB 0,1,SZR     ;SKP IF SRCHED WHOLE TBL
40 01730 000771          JMP RM.L2
41 01731 034407          LDA 3,XRMSE
42 01732 001402          JMP 2,3         ;NO FIND EXIT
43 01733 010405 RM.FN:   ISZ XRMSE
44 01734 000775          JMP RM.FN-2
45 01735 000000 RM.P1:   0
46 01736 000000 RM.P2:   0
47 01737 000000 RM.P3:   0
48 01740 000000 XRMSE:   0
49 01741 002037 ICMPB:   CMAPB
```

```
10026 MPRTS
01
02                ;DIVID=DIVIDE AC1 BY AC2
03                ;LEAVE WITH REM IN AC0
04 01742 102400 DIVID:   SUB     0,0
05 01743 054412          STA     3,DI.S3
06 01744 034412          LDA     3,DI.K1
07 01745 125120          MOVZL   1,1
08 01746 101100 DI.L1:   MOVL    0,0
09 01747 142412          SUB#    2,0,SZC
10 01750 142400          SUB     2,0
11 01751 125100          MOVL    1,1
12 01752 175404          INC     3,3,SZR
13 01753 000773          JMP     DI.L1
14 01754 002401          JMP     @DI.S3
15 01755 000000 DI.S3:   0
16 01756 177760 DI.K1:   -16.
```

```
!0027 MPRTS
01
02
03                ;;CBLIM=CLEAR AVAILABLE BITS BETWEEN LIMITS
04                ;AC0=LOWEST ADRS    AC1=HIGHEST ADRESS
05                ;SINCE SOME USED AREAS MAY OVERLAP IN PAGES
06                ;OCCASIONALLY 2 PASSES THROUGH CMAPB WILL BE REQ
07 01757 054426 CBLIM:  STA     3,XCBLM
08 01760 101300         MOVS    0,0       ;POS 1K
09 01761 125300         MOVS    1,1       ;FIELD BITS
10 01762 101220         MOVZR   0,0       ;FOR ADRS LIMITS
11 01763 101220         MOVZR   0,0       ;IN AC 0 AND 1
12 01764 125220         MOVZR   1,1
13 01765 125220         MOVZR   1,1
14 01766 030424         LDA     2,K37C
15 01767 143400         AND     2,0
16 01770 147400         AND     2,1
17 01771 040417         STA     0,CBLWR ;LWST 1K FLD
18 01772 044417         STA     1,CBUPR ;HGHST 1K FLD
19 01773 020415         LDA     0,CBLWR ;LWR INCS TO=UPR
20 01774 030413         LDA     2,KAVLM ;AVAILABLE MAP
21 01775 006411         JSR     @XCMPB  ;COM BIT IN AVAIL MAP
22 01776 000777         JMP     .-1     ;WENT 0-1 MAKE IT 1-0
23 01777 020411         LDA     0,CBLWR ;AC0=LST CLRED
24 02000 010410         ISZ     CBLWR   ;+1 LWR IN CASE NOT DONE
25 02001 024410         LDA     1,CBUPR
26 02002 106404         SUB     0,1,SZR ;SKP IS ALL REQ UNAVAILABLE
27 02003 000770         JMP     .-10
28 02004 002401         JMP     @XCBLM
29 02005 000000 XCBLM:  0
30 02006 002037 XCMPB:  CMAPB
31 02007 015110 KAVLM:  AVALM
32 02010 000000 CBLWR:  0
33 02011 000000 CBUPR:  0
34 02012 000037 K37C:   37
```

```
!0028 MPRTS
01
02
03                ;GETPA=GET A PHYSICAL ASSIGNMENT
04                ;AC0=ALLOCATION TABLE POSITION
05                ;RETURN WITH AC1=PHYSICAL PAGE ASSIGNMENT
06                ;SKIP EXIT IF THE ALLOC ASSIGN DOES NOT =377
07                ;THE INTEGRETY OF AC0 IS PRESERVED
08 02013 040421 GETPA:  STA     0,GPA,0
09 02014 126400         SUB     1,1
10 02015 101220         MOVZR   0,0
11 02016 125100         MOVL    1,1       ;0=WORD #  1=EVEN/ODD
12 02017 124000         COM     1,1
13 02020 044415         STA     1,GETP, ;SKP SWAP IF EVEN BYTE
14 02021 030100         LDA     2,ALTBL ;ADRS OF ALLOCATION TABLE
15 02022 113000         ADD     0,2       ;+ WORD POSITION IN TABLE
16 02023 025002         LDA     1,2,2   ;2 PAST CTR AND DCH CONTR,
17 02024 010411         ISZ     GETP,   ;SKP SWAP IF EVEN BYTE
18 02025 125300         MOVS    1,1     ;SWAP ODD BYTE TO LWR
19 02026 030410         LDA     2,K,377
20 02027 147400         AND     2,1     ;MASK PHYSICAL PAGE #
21 02030 146414         SUB#    2,1,SZR ;377 IS 128K WR PROTEC
22 02031 175400         INC     3,3     ;SKP EXIT PAGE ASSIGNED
23 02032 020402         LDA     0,GPA,0
24 02033 001400         JMP     0,3
25 02034 000000 GPA,0:  0
26 02035 000000 GETP,:  0
27 02036 000377 K,377:  377
```

```
10029 MPRTS
01
02                ;CMAPB=COMPLIMENT MAP BIT
03                ;COMPLIMENT THE STATE OFAMEMORY MAP BIT
04                ;THE START ADRS OF THE MAP IS INAC2
05                ;AC0 CONTAINS UP TO 7 BITS OF ADDRESSWITH
06                ;BITS 12TO15=# BITS TO SHIFT LEFT
07                ;BITS 9TO11=WORD POSITION IN MAP
08                ;THOSE 7 BITS ARE THE PHYSICL PG # OF A 1K OF MEM
09                ;SKIP ON EXIT IF THE BIT IS GOING 1=0
10 02037 040436 CMAPB:  STA     0,CM,S0
11 02040 044436          STA     1,CM,S1
12 02041 050436          STA     2,CM,S2
13 02042 105220          MOVZR   0,1     ;POSITION WORD # IN AC1
14 02043 125220          MOVZR   1,1
15 02044 125220          MOVZR   1,1
16 02045 125220          MOVZR   1,1
17 02046 133000          ADD     1,2     ;AC2=TABLE (MAP) ADRESS
18 02047 024431          LDA     1,K17
19 02050 107400          AND     0,1     ;AC1=#PLACES TO SHIFT
20 02051 124000          COM     1,1
21 02052 044422          STA     1,CCTR  ;FOR COUNTING SHIFTS
22 02053 126420          SUBZ    1,1     ;AC1=0  C=1
23 02054 125100          MOVL    1,1     ;POSIT BIT
24 02055 010417          ISZ     CCTR
25 02056 000776          JMP     .-2
26 02057 021000          LDA     0,0,2   ;GET MAP WORD
27 02060 050414          STA     2,CCTR  ;SV ADRS
28 02061 131000          MOV     1,2     ;FOR BIT XOR
29 02062 113525          ANDZL   0,2,SNR ;NOT 0 IN RESULT
30 02063 151002          MOV     2,2,SZC ;OR IN CARRY BIT
31 02064 175400          INC     3,3     ;IS SKIP WHEN EXIT
32 02065 107000          ADD     0,1     ;FORM REST OF
33 02066 146400          SUB     2,1     ;BIT XOR
34 02067 046405          STA     1,@CCTR ;PUT NEW WORD BACK
35 02070 020405          LDA     0,CM,S0
36 02071 024405          LDA     1,CM,S1
37 02072 030405          LDA     2,CM,S2
38 02073 001400          JMP     0,3
39 02074 000000 CCTR:  0
40 02075 000000 CM,S0:  0
41 02076 000000 CM,S1:  0
42 02077 000000 CM,S2:  0
43 02100 000017 K17:    17
```

```
10030 MPRTS
01
02                ;CDISP=LINKER CALL DISPATCH ROUTINE
03                ;DIRECTS MEM ALLOCATION AND OTHER CALLS
04                ;TO THE CORRECT HANDLER FOR PROCESSING
05                ;CALLS ARE MADE AS FOLLOWS:
06                ;       NIOC    MAP
07                ;       JSR     @CALLN ;ZPAGE LOCS =CALL ADRS
08                ;       ERROR RETURN
09                ;       NORMAL RETURN
10                ;CALLN WILL BE = TO ONE OF THE FOLLOWING
11                ;ASCRA  ASSIGN A SCRATCH AREA
12                ;ESCRA  EXPAND SCRATCH AREA
13                ;RSCRA  RELEASE SCRATCH AREA
14                ;MSCRA  MOVE TEST TO SCRATCH
15                ;GSCRA  GO TO SCRATCH FOR EXECUTION
16                ;SSCRA  SHUFFLE SCRATCH AREA ASSIGNED
17                ;RETRN  RETURN FROM TEST EXECUTION
18                ;ARANG  RANDOM # GENERATION
19                ;ADMAP  ASSIGN DCH MAP
20                ;EDMAP  EXPAND DCH MAP
21                ;RDMAP  RELEASE DCH FROM MAP
```

```
10031 MPRTS
01
02                ;CALL DISPATCH ROUTINE
03 02101 040502 CDISP:  STA     0,CD.S0
04 02102 044502         STA     1,CD.S1
05 02103 050502         STA     2,CD.S2
06 02104 054502         STA     3,CD.S3
07 02105 060402         DIA     0,MAP     ;GET LOGICAL ADR
08 02106 101400         INC     0,0       ;+1 TO GET JSR
09 02107 105000         MOV     0,1
10 02110 030477         LDA     2,K1777
11 02111 143400         AND     2,0       ;MASK ADRS IN 1K
12 02112 150000         COM     2,2
13 02113 147400         AND     2,1       ;MASK LOGICAL FIELD
14 02114 040474         STA     0,CD.LA   ;SV LGICL ADRS
15 02115 125220         MOVZR   1,1
16 02116 125220         MOVZR   1,1
17 02117 044472         STA     1,CD.LP   ;SV LOGICAL PAGE#
18 02120 102620         SUBZR   0,0       ;AC0=100000
19 02121 123000         ADD     1,0       ;TST DIAG MODE
20 02122 061002         DOA     0,MAP     ;TO GET PHYS PAGE#
21 02123 062402         DIC     0,MAP     ;INTO AC0
22 02124 024473         LDA     1,K377
23 02125 123400         AND     1,0       ;AC0=PHYS PAGE
24 02126 040464         STA     0,CD,PP
25 02127 030465         LDA     2,K1174
26 02130 071002         DOA     2,MAP     ;GET 32K PHYSICAL AS.
27 02131 062402         DIC     0,MAP     ;DINTO AC0
28 02132 123400         AND     1,0
29 02133 153240         ADDOR   2,2       ;CLRS BIT 0 IS ALL
30 02134 143000         ADD     2,0
31 02135 040456         STA     0,C.32K   ;SAVE FOR RESTORE
32 02136 020454         LDA     0,CD.PP
33 02137 143000         ADD     2,0       ;AC0 IS MAP 32K
34 02140 061002         DOA     0,MAP     ;32K MAPPED TO PHYS CALL
35 02141 153120         ADDZL   2,2       ;32K FIELD BITS LEFT 2
36 02142 020446         LDA     0,CD.LA
37 02143 113000         ADD     0,2
38 02144 021000         LDA     0,0,2     ;GETS JSR AFTER NIOC
39 02145 040415         STA     0,CD.EX   ;TO EXEC, IF VALID CALL
40 02146 060177         INTEN
```

```
10032 MPRTS
01
02                ;NOW DETERMINE IF IT IS A VALID CALL
03 02147 024446         LDA     1,CALLS   ;START OF CALLS
04 02150 122433         SUBZ#   1,0,SNC   ;MUST BE=>
05 02151 000447         JMP     ICALL             ;ILLEGAL CALL
06 02152 024444         LDA     1,CALLE   ;LAST VALID CALL
07 02153 122032         ADCZ#   1,0,SZC   ;MUST BE =<
08 02154 000444         JMP     ICALL             ;INVALID CALL
09 02155 020436         LDA     0,C.32K   ;RESTORE 32K MAP
10 02156 061002         DOA     0,MAP
11 02157 020424         LDA     0,CD.S0
12 02160 024424         LDA     1,CD.S1
13 02161 030424         LDA     2,CD.S2
14                ;THE FOLLOWING LOCATION IS ALTERED
15                ;AFTER RETREIVING THE CALLS JSR IT IS
16                ;STORED HERE FOR EXECUTE
17 02162 006053 CD.EX:  JSR     @ASCRA    ;REPLACED BY CALL JSR
18 02163 101011         MOV#    0,0,SKP   ;ERROR RET
19 02164 010424         ISZ     CD.LA     ;NORMAL +1 RETURN
20 02165 010423         ISZ     CD.LA     ;TO GET PAST JSR
21 02166 040415         STA     0,CD.S0
22 02167 044415         STA     1,CD.S1
23 02170 020420         LDA     0,CD.LA
24 02171 024420         LDA     1,CD.LP   ;RECALCULATE LOGICAL
25 02172 127120         ADDZL   1,1       ;RETURN FROM CALL
26 02173 107000         ADD     0,1       ;INTO AC1
27 02174 044414         STA     1,CD.LA
28 02175 024407         LDA     1,CD.S1
29 02176 020405         LDA     0,CD.S0
30 02177 060277         INTDS
31 02200 060102         NIOS    MAP
32 02201 060177         INTEN
33 02202 002406         JMP     @CD.LA
34                ;ABOVE JMP RETURNS TO USER
35 02203 000000 CD.S0:  0
36 02204 000000 CD.S1:  0
37 02205 000000 CD.S2:  0
38 02206 000000 CD.S3:  0
39 02207 001777 K1777:  1777
40 02210 000000 CD.LA:  0
41 02211 000000 CD.LP:  0
42 02212 000000 CD.PP:  0
43 02213 000000 C.32K:  0
44 02214 117400 K1174:  117400
45 02215 006053 CALLS:  JSR     @ASCRA
46 02216 006076 CALLE:  JSR     @PDMAP
47 02217 000377 K377:   377
```

```
10033 MPRTS
01                      ;ILLEGAL SUPERVISOR CALL TYPEOUT
02 02220 006426 ICALL:  JSR #ICAL1
03 02221 002250         ICALT           ;TEXT
04 02222 020766         LDA 0,CD.LA
05 02223 024766         LDA 1,CD.LP
06 02224 127120         ADDZL 1,1       ;RECOMPUTE CALL
07 02225 107000         ADD 0,1         ;ADDRESS
08 02226 006421         JSR #ICAL2
09 02227 020754         LDA 0,CD.S0
10 02230 024754         LDA 1,CD.S1
11 02231 030754         LDA 2,CD.S2
12 02232 006065         JSR #ERROI      ;TYPE PR# AC'S ETC
13 02233 000401         JMP .+1
14 02234 020752         LDA 0,CD.S3
15 02235 024755         LDA 1,CD.PP
16 02236 030724         LDA 2,CD.EX
17 02237 006066         JSR #ERROC
18 02240 000401         JMP .+1
19 02241 030101         LDA 2,PSTRT
20 02242 035006         LDA 3,6,2
21 02243 175120         MOVZL 3,3
22 02244 002401         JMP #,+1
23 02245 003621         IOV.E
24 02246 003122 ICAL1:  MESS
25 02247 003155 ICAL2:  POCT
26 02250 005215 ICALT:  .TXTE (<15><12>
27 02251 144411         ILLEGAL SUPER CALL AT (
28       146314
29       043705
30       146101
31       051640
32       050125
33       151305
34       141640
35       146101
36       120314
37       152101
38       000240
```

```
10034 MPWTS
01
02                      ;ENTPA=ENTER PHYSICAL ASSIGNMENT
03                      ;THE PHYSICAL PAGE # IN AC0 IS ENTERED INTO
04                      ;THE MEMORY ALLOCATION TABLE ASSOCIATED WITH
05                      ;THE TEST THAT IS CURRENTLY ACTIVE
06 02265 054426 ENTPA:  STA     3,XNTPA
07 02266 026100         LDA     1,@ALTBL        ;GET # ENTRIES
08 02267 152400         SLB     2,2
09 02270 125220         MOVZR   1,1     ;AC1 =WORD #
10 02271 151100         MOVL    2,2     ;AC2=EVEN/ODD BYTE
11 02272 150000         COM     2,2     ;SKP/NSKP EVEN BYTE
12 02273 050416         STA     2,ENT,2 ;NSKP/SKP ODD BYTE
13 02274 030100         LDA     2,ALTBL ;ADRS OF ALLOC TBLE
14 02275 133000         ADD     1,2     ;+ WORD #
15 02276 025002         LDA     1,2,2   ;+2 TO GET BY CTRS
16 02277 010412         ISZ     ENT,2   ;SKP IF EV BYTE
17 02300 125300         MOVS    1,1     ;GET ODD BYTE LOW
18 02301 034411         LDA     3,ENT,K ;177400 MSK UPR BYTE
19 02302 167400         AND     3,1
20 02303 107300         ADDS    0,1     ;PHYS PG# ENTERED
21 02304 010405         ISZ     ENT,2   ;SKP IS ODD BYTE
22 02305 125300         MOVS    1,1     ;REPO EVEN BYTE
23 02306 045002         STA     1,2,2   ;PUT ENTRY BACK
24 02307 012100         ISZ     @ALTBL  ;+1# OF ENTRIES
25 02310 002403         JMP     @XNTPA
26 02311 000000 ENT,2:  0
27 02312 177400 ENT,K:  177400
28 02313 000000 XNTPA:  0
```

```
10035 MPRTS
01
02                      ;LDMAP=LOAD MAP OPTION FOR FIRST LEVEL TEST
03                      ;ADJUST THE CONTENTS OF SCRLO AND SCRHI
04                      ;WRITE ACCESS PROTECT ALL PAGES NOT REQ BY TEST
05 02314 040476 LDMAP:  STA     0,LDM,0
06 02315 044476         STA     1,LDM,1
07 02316 050476         STA     2,LDM,2
08 02317 054476         STA     3,LDM,3
09 02320 102400         SUB     0,0
10 02321 040106         STA     0,SCRLO
11 02322 040107         STA     0,SCRHI
12 02323 024077         LDA     1,MPSWT ;=0 IS MAP OPT, NOT EXIST
13 02324 125005         MCV     1,1,SNR
14 02325 000476         JMP     LM,NM   ;MAP OPT NONEXIS
15 02326 061002         DOA     0,MAP   ;MAP PG0 TO ITSELF
16 02327 101400 LM,L1:  INC     0,0
17 02330 024466         LDA     1,LM,K1 ;LOAD PAGES 1 TO 37
18 02331 111300         MOVS    0,2     ;WITH ACCESS PROTECT
19 02332 133000         ADD     1,2
20 02333 071002         DOA     2,MAP
21 02334 151620         INCZL   2,2     ;=40000 IF LAST PG WAS 37
22 02335 153123         ADDZL   2,2,SNC ;C=1 LAST WAS 37
23 02336 000771         JMP     LM,L1
24                      ;ALL PAGES BUT LOG 0(IT ='S0) ACCESS PROTECTED
25                      ;MAP TEST PROGRAM TO ITSELF-MUST BE LESS THAN 1K
26 02337 151100         MOVL    2,2     ;AC2=1 FOR SWITCH
27 02340 024101         LDA     1,PSTRT ;START ADRS OF PROG
28 02341 121300 LM,L2:  MOVS    1,0
29 02342 101220         MOVZR   0,0     ;1K FIELD TO
30 02343 101220         MOVZR   0,0     ;LOWER 5 BITS
31 02344 024453         LDA     1,LM,37
32 02345 123400         AND     1,0
33 02346 105300         MOVS    0,1
34 02347 107000         ADD     0,1     ;LOGICAL=PHYSICAL
35 02350 065002         DOA     1,MAP   ;LOAD MAP REG
36 02351 105700         INCS    0,1
37 02352 127120         ADDZL   1,1
38 02353 030102         LDA     2,PENDA ;LAST USED BY TEST
39 02354 132432         SUBZ#   1,2,SZC ;C=0 IS MAPPED LAST ALRDY
40 02355 000764         JMP     LM,L2
41                      ;ENTER NEXT SEQUENCE WITH AC0=HIGHEST PAGE USED FOR TEST
```

```
10036 MPRTS
01
02                      ;IF TEST HAS SCRATCH AREA ASSIGNED MAP AS MUCH AS POSSIBLE
03                      ;STARTING AT THE FIRST 1K ABOVE PROGRAM STORAGE
04 02356 026100         LDA     1,@ALTBL        ;# 1K FIELDS ASSIGNED
05 02357 125005         MCV     1,1,SNR
06 02360 000425         JMP     LM,DN   ;NO SCRATCH EXIT
07 02361 101400         INC     0,0
08 02362 105300         MOVS    0,1
09 02363 127120         ADDZL   1,1
10 02364 044106         STA     1,SCRLO ;START OF ACCESSABLE SCRAT
11 02365 040434         STA     0,LM,TM
12 02366 102400         SUB     0,0
13 02367 006433 LM,L3:  JSR     @LGTPA  ;NEXT PHYS PAGE ASSIGNED
14 02370 000415         JMP     LM,DN   ;DONE ALL EXIT
15 02371 030430         LDA     2,LM,TM ;AC2=LOGICAL PG. #
16 02372 151300         MOVS    2,2
17 02373 147000         ADD     2,1
18 02374 065002         DOA     1,MAP   ;MAP LOGICAL TO PHYS
19 02375 153120         ADDZL   2,2
20 02376 024422         LDA     1,LM,K2 ;K2=1777
21 02377 133000         ADD     1,2
22 02400 050107         STA     2,SCRHI ;NEW HI SCRATCH LIMIT
23 02401 101400         INC     0,0     ;+1 ALLOC TBL POS
24 02402 010417         ISZ     LM,TM   ;+1 LOGICAL PAGE
25 02403 151523         INCZL   2,2,SNC ;C=1 IF HI IS 77777(32K)
26 02404 000763         JMP     LM,L3
27                      ;MAP OPTION IS SET UP FOR A FIRST LEVEL TEST
28 02405 024406 LM,DN:  LDA     1,LDM,1
29 02406 020404         LDA     0,LDM,0
30 02407 030405         LDA     2,LDM,2
31 02410 034405         LDA     3,LDM,3
32 02411 001400         JMP     0,3
33 02412 000000 LDM,0:  0
34 02413 000000 LDM,1:  0
35 02414 000000 LDM,2:  0
36 02415 000000 LDM,3:  0
37 02416 000377 LM,K1:  377
38 02417 000037 LM,37:  37
39 02420 001777 LM,K2:  1777
40 02421 000000 LM,TM:  0
41 02422 002013 LGTPA:  GETPA
```

```
10037 MPRTS
01
02                ;MAP OPTION DOES NOT EXIST
03                ;SIMPLY SET LIMITS TO SCRATCH AREA ASSIGNED
04 02423 006777 LM.NM: JSR     @LGTPA  ;SKP=AC1 PHYS PAGE#
05 02424 000761        JMP     LM.DN   ;EXIT NO SCRATCH
06 02425 125300        MOVS    1,1
07 02426 127120        ADDZL   1,1
08 02427 044106        STA     1,SCRLO ;LOW=FIRST PHYS 1K
09 02430 006772 LM.L4: JSR     @LGTPA  ;SKP=AC1=PHYS PG#
10 02431 000754        JMP     LM.DN   ;EXIT SCRHI ADJUSTED
11 02432 125300        MOVS    1,1
12 02433 127120        ADDZL   1,1     ;PG# POSITIONED TO PHYS
13 02434 030764        LDA     2,LM.K2
14 02435 133000        ADD     1,2
15 02436 050107        STA     2,SCRHI ;NO TERT CAN HAVE 32K IF
16 02437 101400        INC     0,0
17 02440 000770        JMP     LM.L4   ;MAP OPTION NONEXIST
```

```
10038 MPRTS
01
02
03                ;ASSCR=ASIGN A SCRATCH AREA
04                ;RANDOMLY OR SEQUENTIALLY IF NECESSARY
05                ;ASSIGN 1K SCRATCH TO TEST SKIP ON EXIT
06                ;NO SKIP IF MEMORY ALREADY ASSIGNED
07                ;OR NO SCRATCH AREA AVAILABLE TO ASSIGN
08 02441 040422 ASSCR: STA     0,AS.S0
09 02442 044422        STA     1,AS.S1
10 02443 050422        STA     2,AS.S2
11 02444 054422        STA     3,AS.S3
12 02445 022100        LDA     0,@ALTBL        ;GET #1K'S ASSIGNED
13 02446 101004        MOV     0,0,SZR ;NOT=0 INVALID
14 02447 000407        JMP     AS.XT
15 02450 006417 AS.G1: JSR     @MSEL   ;SELECT A PAGE
16 02451 001250        HIGHK           ;MAX # 1K PAGES
17 02452 015110        AVALM           ;AVAILABLE MAP
18 02453 000403        JMP     AS.XT   ;NO CORE AVAILABLE
19 02454 004611        JSR     ENTPA   ;AC0=PHYS PAGE# ENTE  IT
20 02455 010411        ISZ     AS.S3   ;SKIP ON EXIT
21 02456 004636 AS.XT: JSR     LDMAP   ;LOAD MAP OPT. SET SCRLO+HI
22 02457 020404        LDA     0,AS.S0
23 02460 024404        LDA     1,AS.S1
24 02461 030404        LDA     2,AS.S2
25 02462 022404        JMP     @AS.S3
26 02463 000000 AS.S0: 0
27 02464 000000 AS.S1: 0
28 02465 000000 AS.S2: 0
29 02466 000000 AS.S3: 0
30 02467 001677 MSEL: RMSEL
```

```
10039 MPRTS
01
02
03                ;EXSCR=EXPAND SCRATCH AREA ASSIGNED
04                ;IF MAPPING OPTION EXISTS RANDOM SELECT
05                ;NO MAPPING OPT, TRY NEXT SEQUENTIAL
06                ;RETURN IS TO CALL +1 NO SCRATCH ASSIGNED
07                ;RETURN CALL +2 IF SCRATCH WAS EXPANDED
08 02470 040773 EXSCR:  STA     0,AS,S0
09 02471 044773          STA     1,AS,S1
10 02472 050773          STA     2,AS,S2
11 02473 054773          STA     3,AS,S3
12 02474 022100          LDA     0,@ALTBL        ;# 1K'S ASSIGNED
13 02475 101005          MOV     0,0,SNR
14 02476 000760          JMP     AS,XT   ;CANT EXPAND 0 ASSIGNED
15 02477 024077          LDA     1,MPSWT ;=0 IS NO MAP OPT,
16 02500 125004          MOV     1,1,SZR ;SKP ON NO MAPPING
17 02501 000747          JMP     AS,G1   ;USE RANDOM SELECT
18                ;MAPPING OPTION DOES NOT EXIST ASSIGN NEXT SEQ 1K
19                ;UNLESS IT IS ALREADY BEING USED
20 02502 100400          NEG     0,0
21 02503 100000          COM     0,0     ;CALC ALLOC TBLE POS
22 02504 006441          JSR     @IGTPA  ;EXTRACT PHYS PGE #
23 02505 063077          HALT            ;#=377 CAN'T HAPPEN
24 02506 121400          INC     1,0     ;AC0=NXT PHYS PAGE
25 02507 030743          LDA     2,AS,G1+2       ;ADRS OF AVAILABLE TBL
26 02510 006406          JSR     @EX,I1  ;CMAPP SKPS IF AVAILABLE
27 02511 101001          MOV     0,0,SKP
28 02512 000742          JMP     AS,XT-2 ;1K AVAILABLE ENTER AND REMAP
29 02513 006403          JSR     @EX,I1  ;CMAPP HAS TO SKP
30 02514 063077          HALT
31 02515 000741          JMP     AS,XT   ;EXIT NO EXPANSION
32 02516 002037 EX,I1:  CMAPB
```

```
10042 MPRTS
01
02                ;RLSCR=RELEASE SCRATCH AREA
03                ;REMOVE 1 1K SCRATCH FROM MEM ALLOCATION
04                ;EXIT IS TO CALL +1 ALL SCRATCH RELEASED
05                ;EXIT TO CALL +2 IF STILL SCRATCH LEFT
06 02517 040744 RLSCR:  STA     0,AS,S0
07 02520 044744          STA     1,AS,S1
08 02521 050744          STA     2,AS,S2
09 02522 054744          STA     3,AS,S3
10 02523 022100          LDA     0,@ALTBL        ;#1K'S ASSIGNED
11 02524 100405          NEG     0,0,SNR ;SKP IF ANY ASSIGNED
12 02525 000731          JMP     AS,XT   ;EXIT NONE TO RELESE
13 02526 177000          COM     0,0     ;AC0=#1K'S -1
14 02527 042100          STA     0,@ALTBL        ;TO ENTER 377 LATER
15 02530 006415          JSR     @IGTPA  ;GET PHYS PAGE #
16 02531 063077          HALT            ;ASSIGNED CAN'T=377
17 02532 121000          MOV     1,0
18 02533 030717          LDA     2,AS,G1+2       ;A2=AVAILABLE MAP
19 02534 006762          JSR     @EX,I1  ;CMAPB MAKES 1K AVAIL
20 02535 101001          MOV     0,0,SKP
21 02536 063077          HALT    ;BIT FOR THAT 1K HAD TO =0
22 02537 020405          LDA     0,EX,K1
23 02540 006406          JSR     @NTPA   ;PUT 377 IN ALLOCATION TBL
24 02541 016100          DSZ     @ALTBL  ;-1 # PAGES ASSIGNED
25 02542 000713          JMP     AS,XT-1 ;STILL PAGES LEFT+1 EXIT
26 02543 000713          JMP     AS,XT   ;0 MEM ALLOCATED DON'T SKIP
27 02544 000377 EX,K1:  377
28 02545 002013 IGTPA:  GETPA
29 02546 002265 NTPA:  ENTPA
```

```
10041 MPRTS
01
02
03                ;GOSCR - GO TO SCRATCH
04                ;ENTERED WITH AC0=LOGICAL PAGE TO
05                ;REMAP SCRATCH TO AC1=ERROR RET
06                ;AC2=ADDRESS TO START EXECUTION IN
07                ;THE REMAPPED SCRATCH
08
09 02547 040511 GOSCR:  STA 0,GO,00      ;SAVE CALL PARAMS
10 02550 044511          STA 1,GO,01
11 02551 050511          STA 2,GO,02
12 02552 054511          STA 3,GO,S3
13 02553 034077          LDA 3,MPSWT
14 02554 175005          MOV 3,3,SNR      ;SKP MAP OPT EXISTS
15 02555 002506          JMP @GO,S3       ;GO BACK TO TEST
16 02556 036100          LDA 3,@ALTBL
17 02557 175005          MOV 3,3,SNR      ;SKP SCRATCH ASSIGN
18 02560 002503          JMP @GO,S3       ;NO SCRATCH RETRN
19 02561 102400          SUB 0,0
20 02562 024476          LDA 1,GO,00
21 02563 125300          MOVS 1,1
22 02564 127120          ADDZL 1,1        ;NEW SCRLO FOR REMAP
23 02565 044106          STA 1,SCRLO
24 02566 006476 GO,L1:   JSR @GO,K1       ;GET PHYS ASSIGN
25 02567 000417          JMP GO,GO        ;NO MORE AVAIL
26 02570 030470          LDA 2,GO,00
27 02571 155700          INCS 2,3         ;FOR END CHK
28 02572 151300          MOVS 2,2
29 02573 147000          ADD 2,1
30 02574 065002          DOA 1,MAP        ;LOAD MAP REG
31 02575 153120          ADDZL 2,2
32 02576 024420          LDA 1,GO,1K
33 02577 147000          ADD 2,1
34 02600 044107          STA 1,SCRHI      ;NEW SCR HI FOR REMAP
35 02601 010457          ISZ GO,00        ;+1 LOG PAGE
36 02602 101400          INC 0,0          ;+1 ALLOCATION POS
37 02603 177120          ADDZL 3,3
38 02604 175123          MOVZL 3,3,SNC    ;LAST LOG=37 DONE
39 02605 000761          JMP GO,L1
40 02606 022457 GO,GO:   LDA 0,@GO,K2
41 02607 040460          STA 0,GO,LP
42 02610 022456          LDA 0,@GO,K3
43 02611 040457          STA 0,GO,LA
44 02612 060277          INTDS
45 02613 060102          NIOS MAP
46 02614 060177          INTEN
47 02615 002445          JMP @GO,02
48 02616 001777 GO,1K:   1777
```

```
10042 MPRTS
01
02
03                ;ERRRT - 2ND LEVEL ERROR RETURN
04
05 02617 054444 ERRRT:  STA 3,GO,S3
06 02620 034077          LDA 3,MPSWT
07 02621 177020          ADDZ 3,3         ;C=1 IF MAP
08 02622 034441          LDA 3,GO,S3
09 02623 175003          MOV 3,3,SNC
10 02624 002435          JMP @GO,01       ;NO MAP OPT GO DIRECT
11 02625 040444          STA 0,ERSV0
12 02626 050445          STA 2,ERSV2
13 02627 006445          JSR @ERRK1       ;RELOAD ORIG MAP
14 02630 020441          LDA 0,ERSV0
15 02631 024441          LDA 1,ERSV1
16 02632 030441          LDA 2,ERSV2
17 02633 036442          LDA 3,@ERRK2     ;GET AC3 AT CALL
18 02634 060277          INTDS
19 02635 060102          NIOS MAP
20 02636 060177          INTEN
21 02637 002422          JMP @GO,01       ;RETURN TO TEST ERR
22
23                ;RETN2 - NORMAL 2ND LEVEL END OF TEST RET
24
25 02640 010423 RETN2:  ISZ GO,S3        ;+1 RETURN ADDRESS
26 02641 034426          LDA 3,GO,LP
27 02642 056423          STA 3,@GO,K2     ;RESTORE LOGICAL
28 02643 034425          LDA 3,GO,LA      ;PAGE AND ADDRS
29 02644 056422          STA 3,@GO,K3     ;OF ORIGINAL GSCRA
30 02645 040424          STA 0,ERSV0
31 02646 044424          STA 1,ERSV1
32 02647 050424          STA 2,ERSV2
33 02650 034077          LDA 3,MPSWT
34 02651 175005          MOV 3,3,SNR
35 02652 002411          JMP @GO,S3       ;NO MAP OPT GO DIRECT
36 02653 006421          JSR @ERRK1       ;REMAP TO ORIGINAL
37 02654 020415          LDA 0,ERSV0
38 02655 024415          LDA 1,ERSV1
39 02656 030415          LDA 2,ERSV2
40 02657 002404          JMP @GO,S3       ;RETURN TO 1ST LEVEL TST
```

```
;0043 MPRTS
01
02
03 02660 000000 GO.00:  0
04 02661 000000 GO.01:  0
05 02662 000000 GO.02:  0
06 02663 000000 GO.03:  0
07 02664 002013 GO.K1:  GETPA
08 02665 002211 GO.K2:  CD.LP
09 02666 002210 GO.K3:  CD.LA
10 02667 000000 GO.LP:  0
11 02670 000000 GO.LA:  0
12
13 02671 000000 ERSV0:  0
14 02672 000000 ERSV1:  0
15 02673 000000 ERSV2:  0
16 02674 002314 ERRK1:  LCMAP
17 02675 002206 ERRK2:  CD.S3
```

```
;0044 MPRTS
01
02
03              ;SETLP - SET LP LOOP CALL HANDLER
04              ;PERFORMS SAME FUNCTION AS SETUP IN NORMAL TSTS
05              ;ENTERED VIA JSR @SETUL
06
07 02676 040437 SETLP:  STA 0,ST.S0
08 02677 044437          STA 1,ST.S1
09 02700 024437          LDA 1,ST.K1
10 02701 136414          SLB* 1,3,SZR
11 02702 000412          JMP STNMP       ;NOT A MAP CALL
12 02703 022435          LDA 0,@ST.K2    ;GET LOG ADRS
13 02704 026435          LDA 1,@ST.K3    ;AND LOG PAGE
14 02705 040440          STA 0,ST.LA     ;FOR LOOPL
15 02706 044436          STA 1,ST.LP
16 02707 020433 SETXI:  LDA 0,ST.LK     ;64
17 02710 040433          STA 0,ST.LC     ;FOR LOOP RPT COUNT
18 02711 020424          LDA 0,ST.S0
19 02712 024424          LDA 1,ST.S1
20 02713 001400          JMP 0,3
21              ;LOOP SETUP WAS NOT VIA MAP CALL
22
23 02714 054431 STNMP:  STA 3,ST.LA
24 02715 000772          JMP SETXI
25
26              ;LOOPL - PERFORMS SAME FUNCTION AS LOOP
27              ;ENTERED VIA JSR @LLOOP
28
29 02716 010425 LOOPL:  ISZ ST.LC       ;SKIP IS FINI LOOP
30 02717 101001          MOV 0,0,SKP     ;LOOP BACK
31 02720 001400          JMP 0,3         ;CONTINUE ON
32 02721 040414          STA 0,ST.S0
33 02722 020415          LDA 0,ST.K1     ;CHK FOR
34 02723 116415          SUB* 0,3,SNR    ;SUPER CALL
35 02724 000403          JMP .+3         ;SUPER CALL
36 02725 020410          LDA 0,ST.S0     ;NOT MAP CALL
37 02726 002417          JMP @ST.LA      ;JUST CONTINUE
38 02727 020416          LDA 0,ST.LA     ;LOGICAL START LOOP
39 02730 042410          STA 0,@ST.K2
40 02731 020413          LDA 0,ST.LP     ;IN LOGICAL PAGE
41 02732 042407          STA 0,@ST.K3
42 02733 020402          LDA 0,ST.S0
43 02734 001400          JMP 0,3
44
45 02735 000000 ST.S0:  0
46 02736 000000 ST.S1:  0
47 02737 002163 ST.K1:  CD.EX+1
48 02740 002210 ST.K2:  CD.LA
49 02741 002211 ST.K3:  CD.LP
50 02742 177766 ST.LK:  -10.
51 02743 000000 ST.LC:  0
52 02744 000000 ST.LP:  0
53 02745 000000 ST.LA:  0
```

```
10045 MPRTS
01
02
03                ;ERROH = ERROR HANDLER - PRINT ALL ERR INFO
04                ;FIRST PRINT PRG# AND (AC'S)
05 02746 040535 ERROH:  STA 0,ER.S0
06 02747 044535         STA 1,ER.S1
07 02750 050535         STA 2,ER.S2
08 02751 054535         STA 3,ER.S3
09 02752 010105         ISZ ERTOT       ;+1#ERROR CALLS
10 02753 101000         MOV 0,0
11 02754 102400         SUB 0,0
12 02755 040104         STA 0,TIMSW     ;SO TIME TYPE WILL FOLLOW
13 02756 060477         READS 0
14 02757 103102         ADDL 0,0,SZC    ;SW1=1 NO TYPE
15 02760 000474         JMP EREXI
16 02761 020077         LDA 0,MPSWT
17 02762 101005         MOV 0,0,SNR
18 02763 056465         STA 3,@ER.K2
19 02764 004536         JSR MESS
20 02765 003677         TXT.0
21 02766 026461         LDA 1,@ER.K1    ;GET PROG #
22 02767 004565         JSR ZOCT        ;PRINT IT
23 02770 004532         JSR MESS
24 02771 003706         TXT.1
25 02772 024511         LDA 1,ER.S0     ;PRINT AC'S
26 02773 004562         JSR POCT        ;AT ERROR CALL
27 02774 024510         LDA 1,ER.S1
28 02775 004560         JSR POCT
29 02776 024507         LDA 1,ER.S2
30 02777 004556         JSR POCT
31 03000 026450         LDA 1,@ER.K2
```

```
10046 MPRTS
01
02
03                ;PRINT MEM ALLOCATION ASSIGNMENTS
04
05 03001 004521 ERMPP:  JSR MESS
06 03002 003712         TXT.2
07 03003 024106         LDA 1,SCRLO
08 03004 004551         JSR POCT        ;PRINT SCRATCH LIMITS
09 03005 024107         LDA 1,SCRHI
10 03006 004547         JSR POCT
11 03007 024077         LDA 1,MPSWT     ;GET MAP EXIST
12 03010 125005         MOV 1,1,SNR     ;TYPE MEM ALLOC IF MAP
13 03011 000443         JMP EREXI       ;NO MAP FORGET REST OF TYPE
14 03012 004510         JSR MESS
15 03013 003720         TXT.3
16 03014 024110         LDA 1,DCMLO     ;PRINT DCM LIMITS
17 03015 004540         JSR POCT
18 03016 024111         LDA 1,DCMHI
19 03017 004536         JSR POCT
20 03020 060477         READS 0
21 03021 101100         MOVL 0,0        ;SW2 =1 FORGET ALLOC TBL
22 03022 103102         ADDL 0,0,SZC
23 03023 000431         JMP EREXI
24 03024 102400         SUB 0,0
25 03025 040424         STA 0,ER.C1
26 03026 004474         JSR MESS
27 03027 003725         TXT.4
28
29 03030 020421 ERMPL:  LDA 0,ER.C1     ;PRINT PHYS PAGES
30 03031 006421         JSR @ER.K4      ;ALSO IN MODULO 1K
31 03032 000422         JMP EREXI       ;AND LOGICAL MEM
32 03033 006420         JSR @KCRLF
33 03034 004520         JSR ZOCT
34 03035 127000         ADD 1,1
35 03036 004516         JSR ZOCT
36 03037 020412         LDA 0,ER.C1
37 03040 103120         ADDZL 0,0
38 03041 101300         MOVS 0,0
39 03042 024106         LDA 1,SCRLO
40 03043 107000         ADD 0,1
41 03044 004511         JSR POCT
42 03045 010404         ISZ ER.C1
43 03046 000762         JMP ERMPL
44
45 03047 001546 ER.K1:  CURPR
46 03050 002206 ER.K2:  CD.S3
47 03051 000000 ER.C1:  0
48 03052 002013 ER.K4:  GETPA
49 03053 003266 KCRLF:  CRLF
```

```
10047 MPRTS
01
02
03 03054 060477 EREXI:  READS 0          ;SW@ TO C
04 03055 101103         MOVL 0,0,SNC     ;C=1 IS ERR RELEASE
05 03056 010430         ISZ ER,S3
06 03057 020424         LDA 0,ER,S0
07 03060 024424         LDA 1,ER,S1
08 03061 030424         LDA 2,ER,S2
09 03062 034424         LDA 3,ER,S3
10 03063 001400         JMP 0,3
11
12
13                      ;2ND OR FOLLOWING CALLS PRINT
14                      ;AC0 1 AND 2 = USED FOR TYPEOUT
15                      ;EXPANSION BY INDIVIDUAL TESTS
16
17 03064 040417 ERROE:  STA 0,ER,S0
18 03065 044417         STA 1,ER,S1
19 03066 050417         STA 2,ER,S2
20 03067 054417         STA 3,ER,S3
21 03070 060477         READS 0
22 03071 103102         ADDL 0,0,SZC
23 03072 000762         JMP EREXI
24 03073 004573         JSR CRLF
25 03074 024407         LDA 1,ER,S0
26 03075 004460         JSR POCT
27 03076 024406         LDA 1,ER,S1
28 03077 004456         JSR POCT
29 03100 024405         LDA 1,ER,S2
30 03101 004454         JSR POCT
31 03102 000752         JMP EREXI
32
33 03103 000000 ER,S0: 0
34 03104 000000 ER,S1: 0
35 03105 000000 ER,S2: 0
36 03106 000000 ER,S3: 0
37                      ;TEXT CALL ADRS OF TEXT IS IN AC0
38                      ;CALL MUST ONLY BE MADE WHILE IN FIRST LEVEL TEST
39 03107 040774 ERTXT:  STA 0,ER,S0
40 03110 040410         STA 0,ER,TP
41 03111 044773         STA 1,ER,S1
42 03112 050773         STA 2,ER,S2
43 03113 054773         STA 3,ER,S3
44 03114 060477         READS 0
45 03115 103102         ADDL 0,0,SZC     ;SKP IS OK TO TYPE
46 03116 000741         JMP EREXI+3      ;EXIT TYPE DELETED
47 03117 004403         JSR MESS
48 03120 000000 ER,TP:  0                ;TEXT ADRS STORED HERE
49 03121 000736         JMP EREXI+3
```

```
10048 MPRTS
01                      ;TELETYPE INTERRUPT PACKAGE MODIFIED TO RUN WITH LNKR
02                      ;AC1,AC2 SAVED
03                      ;"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLER
04                      ;"CRLF" PRINTS A CARRIAGE RETURN
05                      ;"POCT" PRINTS C(1) IN OCTAL
06                      ;"ZOCT" PRINTS C(1) IN OCTAL, LEADING ZEROS SUPPRESSED
07                      ;"PDEC" PRINTS C(1) IN DECIMAL, LEADING ZEROS SUPPRESSED,
08                      ;THE ABOVE THREE ARE FOLLOWED BY THE TAB IN P.TAB
09                      ;"TINO" ACCEPTS OCTAL, AND
10                      ;"TINO" ACCEPTS DECIMAL SINGLE PRECISION SIGNED INTEGERS
11                      ;INTO AC1 FROM THE TTI.  LEADING NULLS, TABS,
12                      ;AND SPACES ARE IGNORED.  A 16 BIT UNSIGNED INTEGER IS
13                      ;FORMED, THEN NEGATED IF A MINUS SIGN IS TYPED,
14                      ;EXIT AT CALL+1 IF INPUT ERROR WITH AC0=BAD CHARACTER,
15                      ; (NOT A LEGAL DIGIT OR TERMINATING CHARACTER)
16                      ;EXIT AT CALL+2 UPON TERMINATING CHARACTER
17                      ; WITH AC0=0, 0, 40, 12, 55
18                      ; FOR NULL, TAB, SPACE, CARRIAGE RETURN, COMMA
19                      ;THE ABOVE WAIT FOR TTO DONE, THEN CLEAR TTO.
20                      ;"CHAP" PRINTS ASCII CHARACTOR IN C(0)R; C(0)L MUST BE 0.
21                      ;EXITS CALL +2 IF C(0)R=0, CORRECTS THE PARITY,
22                      ;SIMULATES TAB ON ASR33.
23                      ;"TYPE" PRINTS C(0)R.  MUST HAVE PROPER PARITY.  EXITS AT
24                      ;CALL+1.  REPLACE "TYPE" WITH INTERRUPT TYPE IF DESIRED.
25
26 03122 054555 MESS:   STA 3,MESSR      ;PRINT A TEXT MESSAGE
27 03123 044511         STA     1,P,AC1
28 03124 050511         STA     2,P,AC2
29 03125 010552         ISZ MESSR
30 03126 031400         LDA 2,0,3        ;C(2) POINTS TO MESSAGE
31 03127 024511         LDA 1,P,377      ;A R BIT MASK
32 03130 021000         LDA 0,0,2        ;C(2)=DATA WORD
33 03131 125112         MOVL# 1,1,SZC
34 03132 123701         ANDS 1,0,SKP
35 03133 123401         AND 1,0,SKP      ;C(0)=DATA CHARACTOR RIGHT
36 03134 151400         INC 2,2          ;INC TO NEXT WORD
37 03135 124000         COM 1,1          ;FLIP MASK
38 03136 004503         JSR CHAR         ;PRINT
39 03137 000771         JMP MESS+6       ;ANOTHER
40 03140 000402         JMP     .+2
41 03141 004500 P,LST:  JSR     CHAR
42 03142 024472 PEXIT:  LDA     1,P,AC1
43 03143 030472         LDA     2,P,AC2
44 03144 063511         SKPBZ TTO
45 03145 000777         JMP .-1
46 03146 060211         NIOC TTO
47 03147 176400         SUB 3,3
48 03150 056403         STA 3,@.+3       ;CLR MSKO CONTROL
49 03151 074177         DCBS 3,CPU
50 03152 002525         JMP @MESSR       ;LAST
51 03153 003446         MSKRG
52
```

```
10049 MPRTS
03154 102401 ZOCT:   SUB 0,0,SKP
03155 020462 POCT:   LDA     0,P,C60
03156 050457         STA     2,P,AC2
03157 030435         LDA 2,OCTAB      ;PRINT C(1) IN OCTAL
03160 000404         JMP .+4
03161 050454 PDEC:   STA     2,P,AC2
03162 030442         LDA 2,DECTB      ;PRINT C(1) IN DECIMAL
03163 102400         SUB 0,0
03164 054513         STA 3,MESSR      ;BOTH ENTRYS PRINT NUMBER
03165 044447         STA     1,P,AC1
03166 040445         STA 0,ZSUPP      ;THEN TAB TO NEXT POSITION
03167 050401         STA 2,.+1
03170 000000 DECOCT: 0                ;A"LDA 2,TABLE" INSTRUCTION
03171 010777         ISZ .-1
03172 020444         LDA 0,P,TAB
03173 151005         MOV 2,2,SNR      ;IF TABLE ENTRY=0
03174 000745         JMP P,LST        ;EXIT WITH TAB
03175 034436         LDA 3,ZSUPP      ;ZEROS SUPPRESS STUF
03176 102400         SUB 0,0
03177 146452 DECOT:  SUBO# 2,1,SZC
03200 000405         JMP DECP
03201 146400         SUB 2,1          ;FORM THE DIGIT
03202 034435         LDA 3,P,C60
03203 101400         INC 0,0
03204 000773         JMP DECOT
03205 151235 DECP:   MOVZR# 2,2,SNR
03206 034431         LDA 3,P,C60
03207 054424         STA 3,ZSUPP      ;C(0)=DIGIT
03210 163000         ADD 3,0          ;MAKE ASCII
03211 175004         MOV 3,3,SZR
03212 004427         JSR CHAR         ;PRINT
03213 000755         JMP DECOCT       ;GET NEXT DIGIT
03
03214 030425 OCTAB:  LDA 2,.+1+.-DECOCT
03215 100000         100000
03216 010000         10000
03217 001000         1000
03220 000100         100
03221 000010         10
03222 000001         1
03223 000000         0
03224 030435 DECTB:  LDA 2,.+1+.-DECOCT
      000012 ,RDX 10
03225 023420         10000
03226 001750         1000
03227 000144         100
03230 000012         10
03231 000001         1
03232 000000         0
      000010 ,RDX 8
03233 000000 ZSUPP:  0
03234 000000 P,AC1:  0
03235 000000 P,AC2:  0
03236 000011 P,TAB:  11          ;CHARACTER PRINTED AFTER NUMBERS
03237 000060 P,C60:  60
03240 000377 P,377:  377
```

```
10050 MPRTS
03241 054434 CHAR:   STA 3,CHRET      ;PRINT C(3) RIGHT
03242 161395         MOVS 0,P,SNR     ;RETURN +2 IF NULL
03243 001401         JMP 1,3
03244 115120         MOVZL    0,3     ;COMPUTE EVEN PARITY
03245 177024         ADD      3,3,SZR
03246 000777         JMP      .-1
03247 103200         ACDR     0,0
03250 101300         MOVS     0,0
03251 034460 CHAR1:  LDA      3,P,C11 ;IS THIS A TAB
03252 116415         SUB# 0,3,SNR
03253 000403         JMP CHA.3                ;YES
03254 004424         JSR TYPE                 ;NO PRINT IT
03255 002420         JMP @CHRET               ;EXIT
03256 020456 CHA.3:  LDA      0,P,240 ;SIMULATE A TAB
03257 004421         JSR      TYPE    ;WITH 1 TO 7 SPACES
03260 020416         LDA      0,CHORZ
03261 034447         LDA      3,P,C7
03262 163404         AND      3,0,SZR
03263 000773         JMP      CHA.3
03264 040412         STA 0,CHORZ
03265 002410         JMP @CHRET
03
03266 054411 CRLF:   STA 3,MESSR      ;SAVE RETURN
03267 044745         STA      1,P,AC1
03270 050745         STA      2,P,AC2
03271 020442         LDA 0,P,C15
03272 004747         JSR CHAR         ;PRINT CARRIAGE AND LF
03273 020437         LDA      0,P,C12
03274 000645         JMP      P,LST
30
03275 000000 CHRET:  0
03276 000000 CHORZ:  0
03277 000000 MESSR:  0
```

```
10351 MPRTS
01 03300 054437 TYPE:   STA 3,TYPRET    ;TYPE THE C(0)R IF
02 03301 074477         READS 3         ;SWITCH 1(0).
03 03302 177122         ADDZL 3,3,SZC
04 03303 000412         JMP TDELE               ;INHIBIT TYPE EXIT.
05 03304 063511         SKPBZ TTC
06 03305 000777         JMP .-1
07 03306 000401         JMP .+1
08 03307 063511         SKPBZ TTO
09 03310 000775         JMP .-3         ;INTERRUPTED WAIT
10 03311 034425         LDA 3,P.M03
11 03312 054534         STA 3,MSKRG     ;SET MSKO PRG CONTROL
12 03313 076177         DOBS 3,CPU
13 03314 061111         DOAS 0,TTO
14 03315 034723 TDELE:  LDA     3,P.377
15 03316 175220         MOVZR   3,3
16 03317 163400         AND     3,0
17 03320 116043         ADCO    0,3,SNC
18 03321 034414         LDA     3,P.C40
19 03322 162432         SUBZ#   3,0,SZC ;SKIP NON-PRINTING CHAR
20 03323 010753         ISZ     CHORZ
21 03324 034407         LDA     3,P.C15
22 03325 116445         SUBO    0,3,SNR
23 03326 054750         STA     3,CHORZ ;CLR HORZ POS
24 03327 002410         JMP @TYPRET
25 03330 000007 P.C7:   7
26 03331 000011 P.C11:  11
27 03332 000012 P.C12:  12
28 03333 000015 P.C15:  15
29 03334 000240 P.240:  240
30 03335 000040 P.C40:  40
31 03336 000003 P.M03: 3
32 03337 000000 TYPRET: 0
```

```
10352 MPRTS
01
02
03              ;LINTR - LINKER INTERRUPT HANDLER
04              ;SAVES AC'S CARRY MSKO (0) AND USERMODE
05              ;STATUS ON A PUSH UP STACK
06              ;LOCATED ABOVE MSKO PARAMETERS FOR DEV
07              ;THEREBY MAKING INTERRUPT PROCESSING
08              ;RE-ENTRANT
09              ;DEVICE INTERRUPT ADDRESS AND MSKO HAVE
10              ;BEEN ENTERED BY EACH DEVICE TEST
11              ;PREVIOUSLY PERFORMING THE APPROPRIATE
12              ;NUMBER OF "EINTS" ENTER INTERRUPT SERVICE
13              ;CALLS TO FILL THE APPROPRIATE DEV TABLES
14
15 03340 056503 LINTR:  STA 3,@LSTKP
16 03341 034502         LDA 3,LSTKP
17 03342 175400         INC 3,3         ;SAVE AC3
18 03343 051400         STA 2,0,3       ;A2
19 03344 175400         INC 3,3
20 03345 045400         STA 1,0,3       ;A1
21 03346 175400         INC 3,3
22 03347 041400         STA 0,0,3       ;A0
23 03350 175400         INC 3,3
24 03351 101100         MOVL 0,0        ;CARRY
25 03352 041400         STA 0,0,3
26 03353 175400         INC 3,3
27 03354 020000         LDA 0,0         ;SAVE (0)
28 03355 041400         STA 0,0,3
29 03356 175400         INC 3,3
30 03357 020467         LDA 0,MSKRG
31 03360 041400         STA 0,0,3       ;SAVE MSKO
32 03361 175400         INC 3,3
33 03362 102400         SUB 0,0
34 03363 006402         DIC 1,MAP
35 03364 125102         MOVL 1,1,SZC    ;IF UMODE=1
36 03365 100000         COM 0,0         ;MAKE SWITCH=-1
37 03366 041400         STA 0,0,3       ;SAVE USER MODE
38 03367 175400         INC 3,3
39 03370 101000         MOV 3,0
40 03371 054452         STA 3,LSTKP
41 03372 030524         LDA 2,LK300
42 03373 034452         LDA 3,LMSKS
43 03374 102400         SUB 3,0         ;CALC STACK DEPTH
44 03375 142422         SUBZ 2,0,SZC    ;SKP IS STACK OK
45 03376 063077         HALT    ;INTER STACK OVERFLOW
46 03377 061477         INTA 0
47 03400 113000         ADD 0,2
48 03401 117000         ADD 0,3
49 03402 025400         LDA 1,0,3
50 03403 035000         LDA 3,0,2
51 03404 044442         STA 1,MSKRG
52 03405 006177         DOBS 1,CPU      ;RE-ENABLE INTR
53 03406 005400         JSR 0,3         ;GO TO INTR SERV
```

```
10053 MPRTS
01
02
03                ;LINTO - LINKER INTERRUPT DISMISS
04                ;RETURN ADDRESS WAS GIVEN TO DEVICE
05                ;SERVICE ROUTINES VIA THE JSR @3
06
07 03407 060277 LINTD:  INTDS
08 03410 014433         DSZ LSTKP
09 03411 022432         LDA 0,@LSTKP
10 03412 040432         STA 0,LUSES     ;RETRN USER MODE
11 03413 014430         DSZ LSTKP
12 03414 026427         LDA 1,@LSTKP    ;REST MASK
13 03415 044431         STA 1,MSKRG
14 03416 060077         MSKO 1
15 03417 014424         DSZ LSTKP
16 03420 022423         LDA 0,@LSTKP    ;AND (0)
17 03421 040000         STA 0,0
18 03422 014421         DSZ LSTKP
19 03423 022420         LDA 0,@LSTKP    ;CARRY
20 03424 101200         MOVR 0,0
21 03425 014416         DSZ LSTKP
22 03426 022415         LDA 0,@LSTKP    ;AC0
23 03427 014414         DSZ LSTKP
24 03430 026413         LDA 1,@LSTKP    ;AC1
25 03431 014412         DSZ LSTKP
26 03432 032411         LDA 2,@LSTKP    ;AC2
27 03433 014410         DSZ LSTKP
28 03434 036407         LDA 3,@LSTKP    ;AC3
29 03435 010407         ISZ LUSES       ;SKP TURNS USER MODE ON
30 03436 000402         JMP .+2         ;NOT IN U MODE AT INTR
31 03437 060102         NIOS MAP
32 03440 060177         INTEN
33 03441 002401         JMP @.+1        ;GETS TO LOGICAL 0
34 03442 100000         #0              ;IF USER MODE IS ON
35 03443 000000 LSTKP:  0
36 03444 000000 LUSES:  0
37 03445 000000 LMSKS:  0
38 03446 000000 MSKRG:  0
```

```
10054 MPRTS
01
02
03                ;EINTP, - ENTER INTERRUPT SERVICE PARAMETERS
04                ;(AC0)=DEV# JSR @EINTS
05                ;(AC1)=MSKO
06                ;(AC2)=ADDRESS OF DEV INTR SERV
07
08 03447 054410 EINTP:  STA 3,EI,S3
09 03450 034446         LDA 3,LK300
10 03451 117000         ADD 0,3
11 03452 051400         STA 2,0,3
12 03453 034772         LDA 3,LMSKS
13 03454 117000         ADD 0,3
14 03455 045400         STA 1,0,3
15 03456 002401         JMP @EI,S3
16
17 03457 000000 EI,S3:  0
18
19                ;LCINT - INITIALIZE INTERRUPT SERVICE TABLES
20                ;VECTOR ADDRESSES ARE SET TO ILLEGAL INT
21                ;AND MSKO'S ARE SET TO -1
22                ;LSTKP IS SET TO START 1 AFTER MSKO'S
23 03460 020440 LCINT:  LDA 0,LILLI
24 03461 030435         LDA 2,LK300
25 03462 041000         STA 0,0,2       ;FILL SERVICE
26 03463 151400         INC 2,2         ;VECTORS WITH
27 03464 145300         MOVS 2,1        ;ADRS ILLEGAL INTR
28 03465 125224         MOVZR 1,1,SZR
29 03466 000774         JMP LCINT+2
30 03467 145220         MOVZR 2,1
31 03470 131220         MOVZR 1,2
32 03471 133000         ADD 1,2
33 03472 022425         LDA 0,@LC,K1    ;RESERVE 300 WORDS
34 03473 113000         ADD 0,2         ;ABOVE MEM ALLOC. TBLS
35 03474 052423         STA 2,@LC,K1    ;100 FOR MSKO
36 03475 132400         SUB 1,2
37 03476 050745         STA 2,LSTKP     ;200 FOR STACK
38 03477 010744         ISZ LSTKP
39 03500 125220         MOVZR 1,1
40 03501 102000         ADC 0,0
41 03502 041000         STA 0,0,2
42 03503 113000         ADD 0,2
43 03504 107004         ADD 0,1,SZR
44 03505 000775         JMP .-3
45 03506 151400         INC 2,2
46 03507 050736         STA 2,LMSKS
47 03510 020405         LDA 0,LC,K2
48 03511 040001         STA 0,1
49 03512 102400         SUB 0,0
50 03513 040733         STA 0,MSKRG     ;STRT INT MSK =0
51 03514 001400         JMP 0,3
52 03515 003340 LC,K2:  LINTR
53 03516 000300 LK300:  300
54 03517 001211 LC,K1:  LSETB
55 03520 003521 LILLI:  LILLI+1
56 03521 003077         HALT            ;ILLEGAL INTR DEV#
57 03522 001400         JMP 0,3         ;IS IN AC0
```

```
10055 MPRTS
01
02
03                ;IOVAL
04                ;I/O VALIDITY TRAP HANDLER
05                ;DETERMINE LEGALITY OF TRAP ERROR OR IF NOT EXPECTED
06 03523 040505 IOVAL:  STA 0,IOV,0
07 03524 044505         STA 1,IOV,1
08 03525 050505         STA 2,IOV,2      ;SAVE AC'S
09 03526 054505         STA 3,IOV,3
10 03527 102560         SUBCL 0,0
11 03530 040504         STA 0,IOV,4
12 03531 060402         DIA 0,MAP        ;GET MAP REG'S
13 03532 065402         DIB 1,MAP
14 03533 072402         DIC 2,MAP
15 03534 060177         INTEN
16 03535 040500         STA 0,IOV,A
17 03536 044500         STA 1,IOV,B
18 03537 050500         STA 2,IOV,C
19 03540 034101         LDA 3,PSTRT
20 03541 035406         LDA 3,6,3
21 03542 175122         MOVZL 3,3,SZC    ;BIT 0=1 IS EXPECTED TRP
22 03543 000456         JMP IOV,E        ;EXPECTED TRAP RETURN
23 03544 175220         MOVZR 3,3
24 03545 054473         STA 3,IOV,R
25 03546 006474         JSR @IOMES       ;PRINT HEADER
26 03547 003643         IOTXI
27 03550 020465 IOVPR:  LDA 0,IOV,A
28 03551 006065         JSR @ERROI       ;FINISH PRG# MAP ETC
29 03552 000401         JMP .+1
30 03553 006467         JSR @IOMES       ;TYPE AC'S HEADER
31 03554 003753         IOTX3
32 03555 020453         LDA 0,IOV,0
33 03556 024453         LDA 1,IOV,1
34 03557 030453         LDA 2,IOV,2
35 03560 006066         JSR @ERROC       ;PRINT AC 0,1 AND 2 AT TRP
36 03561 000401         JMP .+1
37 03562 006460         JSR @IOMES
38 03563 003762         IOTX4
39 03564 020447         LDA 0,IOV,3      ;PRINT AC3 CARRY AND RETRN
40 03565 024447         LDA 1,IOV,4
41 03566 030452         LDA 2,IOV,R
42 03567 006066         JSR @ERROC
43 03570 000401         JMP .+1
44 03571 155100         MOVL 2,3
45 03572 000427         JMP IOV,E
```

```
10056 MPRTS
01
02
03                ;DWCHK - DEFER OR WRITE CHECK TRAP
04                ;DETERMINE LEGALITY OF TRAP
05                ;OR ERROR TYPE IF NOT EXPECTED
06
07 03573 040435 DWCHK:  STA 0,IOV,0
08 03574 044435         STA 1,IOV,1
09 03575 050435         STA 2,IOV,2      ;SAVE AC'S
10 03576 054435         STA 3,IOV,3
11 03577 102560         SUBCL 0,0
12 03600 040434         STA 0,IOV,4
13 03601 060402         DIA 0,MAP        ;GET MAP REG
14 03602 061402         DIB 0,MAP
15 03603 062402         DIC 0,MAP
16 03604 060177         INTEN
17 03605 040430         STA 0,IOV,A
18 03606 044430         STA 1,IOV,B
19 03607 050430         STA 2,IOV,C
20 03610 034101         LDA 3,PSTRT
21 03611 035407         LDA 3,7,3
22 03612 175122         MOVZL 3,3,SZC    ;GET DEFER WRITE CHK RETRN
23 03613 000406         JMP IOV,E
24 03614 175220         MOVZR 3,3
25 03615 054423         STA 3,IOV,R
26 03616 006424         JSR @IOMES       ;TYPE ERROR
27 03617 003660         IOTX2
28 03620 000730         JMP IOVPR        ;FINISH TYPEOUT
```

```
10057 MPRTS
01
02
03                      ;I/O OR VALIDITY TRAP RETURN
04                      ;RETURN TO TEST FORCING VIOLATION
05                      ;LOGICAL ADDRESS IS IN AC3 - LEFT 1
06 03621 175220 IOV.E:  MOVZR 3,3       ;AC0=1-2=MAP REGISTERS
07 03622 054411         STA 3,IOV,3
08 03623 006416         JSR @IORLM      ;RELOAD MAP IN CASE 2ND LVL
09 03624 060277         INTDS
10 03625 060102         NIOS MAP
11 03626 060177         INTEN
12 03627 002404         JMP @IOV,3
13 03630 000000 IOV,0:  0
14 03631 000000 IOV,1:  0
15 03632 000000 IOV,2:  0
16 03633 000000 IOV,3:  0
17 03634 000000 IOV,4:  0
18 03635 000000 IOV,A:  0
19 03636 000000 IOV,B:  0
20 03637 000000 IOV,C:  0
21 03640 000000 IOV,R:  0
22 03641 002314 IORLM:  LDMAP
23 03642 003122 IOMESS: MESS
24 03643 005215 IOTXI:  .TXTE (<15><12>
25 03644 144411         I/O OR VALIDITY TRAP (
26       147657
27       147640
28       120322
29       040526
30       144714
31       144504
32       054724
33       152240
34       040722
35       120120
36       000000
37
38 03660 005215 IOTX2:  .TXTE (<15><12>
39 03661 042011         DEFER OR WRITE CHECK TRAP (
40       143305
41       151305
42       147640
43       120322
44       151327
45       152311
46       120305
47       044303
48       141705
49       120113
50       151324
51       050101
52       000240
```

```
10058 MPRTS
01 03677 005215 TXT,0:  .TXTE (<15><12>
02 03700 151120 PROGRAM # (
03       043717
04       040722
05       120115
06       120243
07       000000
08 03705 005215 TXT,1:  .TXTE (<15><12>
09 03707 141501 ACTS (
10       051447
11       000240
12 03712 005215 TXT,2:  .TXTE (<15><12>
13 03713 141523 SCRLO/HI (
14       146322
15       127717
16       144510
17       000240
18 03720 141504 TXT,3:  .TXTE (DCHLO/HI (
19       146110
20       127717
21       144510
22       000240
23 03725 005215 TXT,4:  .TXTE (<15><12>
24 03726 142515 MEM ALLOCATION TABLE<15><12>
25       120115
26       146101
27       147714
28       040703
29       144724
30       047317
31       152240
32       041101
33       142714
34       005215
35 03741 044120 PHYS    MODIK   LOGICAL(
36       051531
37       046411
38       042317
39       045661
40       146011
41       043717
42       141711
43       146101
44       000000
```

```
!0059 MPRTS
01 03753 005215 IOTX3:  .TXTE (<15><12>AC0      AC1     AC2(
02       141501
03       004460
04       141501
05       004661
06       141501
07       000262
08 03762 005215 IOTX4:  .TXTE (<15><12>AC3      CARRY   RET ADRS(
09       141501
10       004463
11       040703
12       151322
13       004531
14       142722
15       120324
16       042101
17       051722
18       000000
```

```
!0060 MPRTS
01                ;AMSCR-ASIGN A SCRATCH AREA TO DCH
02                ;NO SKIP IF MEMORY ASSIGNED
03                ;OR NO SCRATCH AREA AVAILABLE TO ASSIGN
04 03775 040452 AMSCR:  STA 0,AM,S0
05 03776 044452         STA 1,AM,S1
06 03777 050453         STA 2,AM,S3
07 04000 054452         STA 3,AM,S3
08 04001 022100         LDA 0,@ALTBL      ;GET #1K'S ASSIGNED
09 04002 101005         MOV 0,0,SNR       ;NOT=0 INVALID NONSCR TO ASSIGN
10 04003 000427         JMP AM,XT
11 04004 030100         LDA 2,ALTBL
12 04005 025001         LDA 1,1,2
13 04006 125004         MOV 1,1,SZR       ;ERROR EXIT IF
14 04007 000423         JMP AM,XT         ;DCH ALREADY ASSIGNED
15 04010 020077         LDA 0,MPSWT
16 04011 101005         MOV 0,0,SNR       ;SKIP IF MAP OPT
17 04012 000425         JMP AM,NM
18 04013 006444 AM,GI:  JSR @AM,RM        ;SELECT A PAGE
19 04014 004053         AM,37             ;PAGE 0 TO 37
20 04015 015120         DCHM0             ;IN DCH MAP
21 04016 000414         JMP AM,XT         ;NO CORE AVAILABLE
22 04017 105300         MOVS 0,1          ;0=LOG
23 04020 125700         INCS 1,1          ;1 OPR=+1
24 04021 030100         LDA 2,ALTBL
25 04022 045001         STA 1,1,2         ;SAVE DCH
26 04023 040431         STA 0,AM,TM
27 04024 102400         SUB 0,0
28 04025 006431         JSR @AM,GA
29 04026 063077         HALT
30 04027 020425         LDA 0,AM,TM
31 04030 004536         JSR LDCHM
32 04031 010421         ISZ AM,S3         ;SKIP ON EXIT
33 04032 004551 AM,XT:  JSR LDCHL         ;LOAD MAP OPT, SET SCR;0=HI
34 04033 020414         LDA 0,AM,S0
35 04034 024414         LDA 1,AM,S1
36 04035 030414         LDA 2,AM,S2
37 04036 002414         JMP @AM,S3
38                ;MAP OPT DOES NOT EXIST
39                ;USE FIRST 1K SCR ASSIGNED
40 04037 102400 AM,NM:  SUB 0,0
41 04040 006416         JSR @AM,GA
42 04041 063077         HALT
43 04042 125300         MOVS 1,1
44 04043 125700         INCS 1,1
45 04044 030100         LDA 2,ALTBL       ;ENTER DCH ASSIGND
46 04045 045001         STA 1,1,2
47 04046 000763         JMP AM,XT-1
48 04047 000000 AM,S0: 0
49 04050 000000 AM,S1: 0
50 04051 000000 AM,S2: 0
51 04052 000000 AM,S3: 0
52 04053 000037 AM,37: 37
53 04054 000000 AM,TM: 0
54 04055 000377 AM377: 377
55 04056 002013 AM,GA: GETPA
56 04057 001677 AM,RM: RMSEL
```

```
10061 MPRTS
01
02
03                ;EMSCR-
04                ;EXPAND DCH SCRATCH AREA
05
06 04060 040767 EMSCR:  STA 0,AM,S0
07 04061 044767         STA 1,AM,S1
08 04062 050767         STA 2,AM,S2
09 04063 054767         STA 3,AM,S3
10 04064 030100         LDA 2,ALTBL
11 04065 021000         LDA 0,0,2       ;AC0=#1K SCR
12 04066 025001         LDA 1,1,2       ;AC1=DCH LIMIT
13 04067 034764         LDA 3,AM,37
14 04070 137400         AND 1,3         ;3=START DCH LOG
15 04071 166700         SUBS 3,1        ;1=#1K'S DCH
16 04072 122415         SUB# 1,0,SNR    ;SKIP=NOT ALL AS-DCH
17 04073 000737         JMP AM,XT       ;EXIT ALL SR-DCH
18 04074 020077         LDA 0,MPSWT
19 04075 101004         MOV 0,0,SZR     ;SKIP IF NOT MAPPED
20 04076 000407         JMP EM,UM
21 04077 125700         INCS 1,1        ;+1 #DCH 1K'S
22 04100 137000         ADD 1,3
23 04101 055001         STA 3,1,2
24 04102 000727         JMP AM,XT-1     ;SKIP EXIT 1 MORE 1K
25
26
27                ;MAP OPTION EXISTS SEE IF THE NEXT
28                ;LOGICAL 1K DCH IS AVAILABLE
29 04103 000040 EM40: 40
30 04104 002037 EM,CM:  CMAPB
31 04105 137000 EM,UM:  ADD 1,3
32 04106 161000         MOV 3,0         ;(0)=NEXT HIGH DCH
33 04107 034774         LDA 3,EM40
34 04110 162415         SUB# 3,0,SNR    ;SKIP IS STILL IN 32K
35 04111 000721         JMP AM,XT
36 04112 030703         LDA 2,AM,GI+2   ;DCH BIT MAP
37 04113 006771         JSR @EM,CM      ;SKIP IF AVAIL
38 04114 006770         JSR @EM,CM      ;WASN'T SET IT=0 AND SKP
39 04115 135701         INCS 1,3,SKP    ;(3)UPPR=NEW DCH+1K
40 04116 000714         JMP AM,XT       ;EXIT CANT EXPAND UP
41 04117 040735         STA 0,AM,TM
42 04120 122400         SUB 1,0
43 04121 117000         ADD 0,3
44 04122 030100         LDA 2,ALTBL
45 04123 055001         STA 3,1,2       ;RESTORE DCH ASSIGNMENTS
46 04124 121000         MOV 1,0         ;GET PHYSICAL PAGE #
47 04125 006731         JSR @AM,GA
48 04126 063077         HALT
49 04127 020725         LDA 0,AM,TM
50 04130 004436         JSR LDCHM
51 04131 000700         JMP AM,XT-1
```

```
10062 MPRTS
01
02
03                ;RDSCR - RELEASE SCRATCH FROM DCH
04
05 04132 040715 RDSCR:  STA 0,AM,S0
06 04133 044715         STA 1,AM,S1
07 04134 050715         STA 2,AM,S2
08 04135 054715         STA 3,AM,S3
09 04136 030100         LDA 2,ALTBL
10 04137 021001         LDA 0,1,2
11 04140 101005         MOV 0,0,SNR
12 04141 000671         JMP AM,XT       ;EXIT NO DCH TO RELEASE
13 04142 126000         ADC 1,1         ;-1
14 04143 101300         MOVS 0,0
15 04144 123300         ADDS 1,0        ;#1K'S IN DCH-1
16 04145 041001         STA 0,1,2
17 04146 024705         LDA 1,AM,37     ;(AC1) AFTER AND
18 04147 107400         AND 0,1         ;=LOGICAL PAGE #
19 04150 122704         SUBS 1,0,SZR    ;AC0=#1K'S LEFT
20 04151 000403         JMP .+3
21 04152 041001         STA 0,1,2       ;0 DCH ASSIGNED
22 04153 014677         DSZ AM,S3       ;NO SKIP ON EXIT
23 04154 034077         LDA 3,MPSWT
24 04155 175005         MOV 3,3,SNR     ;SKIP IF REALLY MAPPED
25 04156 000653         JMP AM,XT-1
26 04157 123000         ADD 1,0         ;AC0=LOG PAGE #
27 04160 024675         LDA 1,AM377     ;TO ACCESS PROTECT
28 04161 004405         JSR LDCHM
29 04162 030633         LDA 2,AM,GI+2   ;ADRS OF DCH AVAIL MAP
30 04163 006721         JSR @EM,CM      ;MAKE 1K DCH AVAIL
31 04164 000645         JMP AM,XT-1     ;EXIT NEW DCH LIM'S
32 04165 063077         HALT    ;DCH MAP BIT WAS ALRDY 1(CAN'T HAPPEN)
```

```
10063 MPRTS
01
02
03                ;LDCHM - LOAD DATA CHANNEL MAP
04                ;LOGICAL DCH IS IN AC0
05                ;PHYSICAL DCH IS IN AC1
06                ;USED BY ASSIGN DCH AND EXPAND DCH
07 04166 040412 LDCHM:  STA 0,LDC.0
08 04167 101300         MOVS 0,0
09 04170 044411         STA 1,LDC.1
10 04171 123000         ADD 1,0
11 04172 024410         LDA 1,LDC.K
12 04173 123000         ADD 1,0
13 04174 061002         DOA 0,MAP
14 04175 024404         LDA 1,LDC.1
15 04176 020402         LDA 0,LDC.0
16 04177 001400         JMP 0,3
17
18 04200 000000 LDC.0: 0
19 04201 000000 LDC.1: 0
20 04202 020000 LDC.K:  20000           ;BIT FOR DCH LOAD
21
22                ;LDCHL - LOAD DATA CHANNEL LIMITS
23                ;CALCULATE DCHHI/LO FOR THIS TST
24                ;INTEGRITY OF AC'S NOT PRESERVED
25 04203 030100 LDCHL:  LDA 2,ALTBL
26 04204 025001         LDA 1,1,2       ;AC1 UPPER=#1K'S
27 04205 020646         LDA 0,AM.37     ;AC1 LOWER=1ST LOG 1K
28 04206 123400         AND 1,0
29 04207 106400         SUB 0,1
30 04210 101300         MOVS 0,0
31 04211 103120         ADDZL 0,0       ;AC0=LO LIMIT DCH
32 04212 040110         STA 0,DCHLO
33 04213 127125         ADDZL 1,1,SNR   ;AC1=MOD 1K # 1'K
34 04214 125040         MOVO 1,1        ;SET C=1 NO 1K'S
35 04215 123000         ADD 1,0         ;AC0=HIGH SCR+1
36 04216 126500         SUBL 1,1        ;AC1=1 IF DCH ASSIGNED
37 04217 122400         SUB 1,0         ;AC1=0 IF NO DCH
38 04220 040111         STA 0,DCHHI     ;HI DCH LOG LIMIT
39 04221 001400         JMP 0,3
```

```
10064 MPRTS
01                ;LPRSL-LINKER PROGRAM SELECT OR,
02                ;ALLOW USER TO SELECT PROGRAMS TO RUN
03                ;TYPES CORE SIZE MAP EXIST AND ACTIVE PROGRAMS
04                ;IF (LAUTO)=-1 GIVES OPERATOR A CHANCE TO
05                ;DELETE SPECIFIC PROGRAMS
06 04222 001026         LAUTO
07 04223 054475 LPRSL:  STA 3,LPSV3
08 04224 102400         SUB 0,0
09 04225 040474         STA 0,LPRGN
10 04226 020502         LDA 0,LPRT1     ;FIRST TXT ADRS
11 04227 006060         JSR @ERRTX
12 04230 026472         LDA 1,@LPHIK    ;GET HIGHK PHYS.
13 04231 127000         ADD 1,1         ;=MOD 1K
14 04232 006464         JSR @LPZOC      ;PRINT SUPR 0'S
15 04233 024477         LDA 1,MPSWT
16 04234 020526         LDA 0,MPXTX     ;MAP EXIST TEXT
17 04235 125005         MOV 1,1,SNR     ;SKP IF MAP EXIS
18 04236 020534         LDA 0,NMPTX     ;NO MAP TEXT
19 04237 006060         JSR @ERRTX
20 04240 026762         LDA 1,@LPRSL-1
21 04241 020537         LDA 0,LPRT2
22 04242 125004         MOV 1,1,SZR     ;SKP IF AUTO STRT
23 04243 020550         LDA 0,LPRT3     ;NOT AUTO USE OTHR HDR
24 04244 006060         JSR @ERRTX
25 04245 020452         LDA 0,LPRT4
26 04246 006060         JSR @ERRTX      ;PRT PRG HDR
27 04247 006457         JSR @LPRCR      ;CARRET LFEED TST 0
28                ;NEXT PAGE PRINT INDIVIDUALL PROGRAM DESCRIPTIONS
```

```
10065 MPRTS
01                      ;PRINT IDIVIDUAL TEST DESCRIPTIONS
02                      ;GIVE OPR CHANCE TO DELETE IF LAUTO#=1
03 04250 020451 LPRLP:  LDA 0,LPRGN     ;CUR PROG #
04 04251 034444         LDA 3,LPLZM
05 04252 117000         ADD 0,3
06 04253 031400         LDA 2,0,3
07 04254 151005         MOV 2,2,SNR     ;SKP IF NOT LAST
08 04255 002443         JMP @LPSV3
09 04256 105000         MOV 0,1
10 04257 021002         LDA 0,2,2       ;GET PRG WAIT SW
11 04260 101004         MOV 0,0,SZR     ;SKP IF PRG NOT WAIT
12 04261 000431         JMP LPR1E       ;DEV MUST NOT EXIST
13 04262 050445         STA 2,LPIDx
14 04263 006433         JSR @LPZOC      ;TYPE PRG #
15 04264 020443         LDA 0,LPIDx
16 04265 024440         LDA 1,LPR10
17 04266 123000         ADD 1,0         ;CALC ADRS DESC TXT
18 04267 006060         JSR @ERRTX
19 04270 026732         LDA 1,*LPRSL-1
20 04271 125005         MOV 1,1,SNR     ;SKP IS LET OPR SELECT
21 04272 000417         JMP LPR1E-1     ;CR/LF AND DO NXT PRG
```

```
10066 MPRTS
01                      ;WAIT FOR OPERATOR INPUT TO SELECT TEST
02                      ;SPACE IS SELECT ANY OTHER IS DELETE
03 04273 060277         INTDS
04 04274 063610         SKPDN TTI
05 04275 000777         JMP .-1
06 04276 064610         DIAC 1,TTI      ;GET CHAR
07 04277 030424         LDA 2,LPR77
08 04300 147400         AND 2,1
09 04301 030423         LDA 2,LPR40
10 04302 146415         SUB# 2,1,SNR    ;SKP IF DELETED
11 04303 000406         JMP LPR1E-1     ;SELECTED CR/LF DO NEXT
12 04304 030423         LDA 2,LPIDX
13 04305 102000         ADC 0,0
14 04306 041002         STA 0,2,2       ;SET WAIT SW IN PRG
15 04307 020555         LDA 0,LPDTX
16 04310 006060         JSR @ERRTX      ;PRINT DELETED
17 04311 006415         JSR @LPRCR      ;CR/LF
18 04312 010407 LPR1E:  ISZ LPRGN       ;+1 PROG #
19 04313 060177         INTEN
20 04314 000734         JMP LPRLP       ;DO NEXT PROG
21 04315 000112 LPLZM:  LZMAX
22 04316 003154 LPZOC:  ZOCT
23 04317 004452 LPRT4:  LPR4T
24 04320 000000 LPSV3:  0
25 04321 000000 LPRGN:  0
26 04322 001250 LPHIK:  HIGHK
27 04323 000077 LPR77:  77
28 04324 000040 LPR40:  40
29 04325 000010 LPR10:  10
30 04326 003266 LPRCR:  CRLF
31 04327 000000 LPIDX:  0
```

```
10067 MPRTS
01 04330 004331 LPRT1:  .+1
02 04331 005215         .TXTE (<15><12>MPROG, REL, REV 02 01/11/74
03       050115
04       147722
05       027107
06       151240
07       146305
08       120056
09       142722
10       120126
11       131060
12       030240
13       127661
14       130661
15       133657
16 04347 106664 <15><12>HIGH CORE MODIK= (
17       044012
18       043711
19       120110
20       147703
21       142722
22       046640
23       042317
24       045661
25       120275
26       000000
```

```
10068 MPRTS
01 04362 004363 MPXTX:  .+1
02 04363 134240         .TXTE ( 8021 EXISTS(
03       131060
04       120261
05       154305
06       051711
07       051724
08       000000
09 04372 004373 NMPTX:  .+1
10 04373 047240         .TXTE ( NO 8021(
11       120317
12       030270
13       130662
14       000000
15 04400 004401 LPRT2:  .+1
16 04401 005215         .TXTE (<15><12>PROGRAM RUN LIST(
17       151120
18       043717
19       040722
20       120115
21       052722
22       120116
23       144714
24       152123
25       000000
26 04413 004414 LPRT3:  .+1
27 04414 005215         .TXTE (<15><12>TO SELECT A TEST TYPE IN
28       147724
29       051640
30       146305
31       141705
32       120324
33       120171
34       142724
35       152123
36       152240
37       050131
38       120305
39       047311
40 04431 040640  A SPACE=ANY OTHER CHAR, DELETES(
41       051640
42       040520
43       142703
44       040455
45       054516
46       147640
47       044324
48       151305
49       141640
50       040510
51       027322
52       042240
53       146305
54       152305
55       051705
56       000000
```

```
10069 MPRT5
01 04452 005215 LPR4T:  .TXTE (<15><12>PRG#     DESCRIPTION(
02       151120
03       121507
04       042011
05       051705
06       151303
07       050311
08       144724
09       047317
10       000000
11 04464 004465 LPDTX:  .+1
12 04465 042240         .TXTE    ( DELETED(
13       146305
14       152305
15       042305
16       000000
```

```
10070 MPRT5
01
                        .TITL CBRDS
03                      ;MEMORY CHECKERBOARD RANDOM TO RUN WITH LINKER
04                      ;PATTERN GENERATION AND CHECKING IS
05                      ;MOVED INTO THE SELECTED SCRATCH AREAS
06                      ;FOR EXECUTION
07                      ;
08
09                      ;DEF'S TO LINKER PARAMETER FILE FOLLOWS
10                      NEXTT CB,00
11       004472 LMEML=.
12       000112         .LOC LPG0
13 00112 004473         CB,00
14       000113 LPG0=.
15       004472         .LOC LMEML
16 04472 000000         0       ;INTERRUPT TIMEOUT SWITCH
17 04473 004512 CB,00:  CB,01   ;INIT ENTRY ADRS.
18 04474 004515         CB,02   ;EXECUTE ENTRY ADRS
19 04475 000000         0       ;NO INTR WAITS
20 04476 000000         0       ;RAND SEL LIMITS
21 04477 177777         -1      ;=ALWAYS ENTER
22 04500 176000         176000  ;EVERY PROTECT BIT ON
23 04501 004655         CB,EC   ;NO I/O VALIDITY TRAPS
24 04502 004655         CB,EC   ;NO WRITE OR DEFER TRAPS
25                      .TXTE (
26 04503 044303 CHKRBRD RAN.(
27       151113
28       151102
29       120104
30       040722
31       027116
32       000000
```

```
10071 MPRTS
01                ;INITIALIZE CHECKERBOARD TEST SEQUENCE
02 04512 102000 CB,01:  ADC 0,0
03 04513 040566         STA 0,CB,TK       ;=1 TO TEST COUNTER
04 04514 001400         JMP 0,3 ;RETURN TO LINKER TEST INIT
05                ;
06                ;EXECUTE ENTRY POINT
07 04515 010564 CB,02:  ISZ CB,TK         ;SKP IS NO SCRATCH
08 04516 000501         JMP CB,03         ;DO NXT IN SEQ
09                      LCALL ASCRA       ;TRY TO GET 1K
10 04517 060202         NIOC MAP
11 04520 006053         JSR @ASCRA
12 04521 000514         JMP CB,X1         ;NONE AVAILABLE
13 04522 102000         ADC 0,0           ;=1 TO
14 04523 040567         STA 0,CB,ES       ;NO ERRSW
15                      LCALL ARANG       ;GET RAN#
16 04524 060202         NIOC MAP
17 04525 006062         JSR @ARANG
18 04526 030554         LDA 2,CB,37
19 04527 105000         MOV 0,1
20                      LCALL ADIVI       ;REM=#1K'S TO EXPAND
21 04530 060202         NIOC MAP
22 04531 006063         JSR @ADIVI
23 04532 100405         NEG 0,0,SNR
24 04533 000406         JMP CB,2A
25                CB,2L:  LCALL ESCRA     ;EXPAND SCRATCH 1K
26 04534 060202         NIOC MAP
27 04535 006054         JSR @ESCRA
28 04536 000403         JMP CB,2A         ;NO MORE AVAILABLE
29 04537 101404         INC 0,0,SZR
30 04540 000774         JMP CB,2L         ;KEEP EXPANDING
```

```
10072 MPRTS
01
02                ;SCRATCH AREA HAS BEEN ASSIGNED RANDOMLY SEL
03                ;=HERE TO MOVE TEST WITHIN SCRATCH AREA
04                CB,2A:  LCALL ARANG       ;GET RAN #
05 04541 060202           NIOC MAP
06 04542 006062           JSR @ARANG
07 04543 024106           LDA 1,SCRLO
08 04544 030107           LDA 2,SCRHI
09 04545 132400           SUB 1,2           ;# WORDS IN SCRATCH
10 04546 105000           MOV 0,1
11                        LCALL ADIVI       ;CREATE AN ADRS
12 04547 060202           NIOC MAP
13 04550 006063           JSR @ADIVI
14 04551 024106           LDA 1,SCRLO       ;WITHIN SCRATCH
15 04552 123000           ADD 1,0           ;TO RELOCATE TO
16 04553 030530 CB,2C:    LDA 2,CB,PL       ;PROG LENGTH
17 04554 142400           SUB 2,0
18 04555 024537           LDA 1,CBPL2
19 04556 122400           SUB 1,0           ;CALC LOW REL ADRS
20 04557 024106           LDA 1,SCRLO
21 04560 122433           SUBZ# 1,0,SNC     ;SKP >LOLIMIT
22 04561 143000           ADD 2,0 ;MAKE GRTR THAN LO
23 04562 122433           SUBZ# 1,0,SNC
24 04563 000776           JMP .-2
25 04564 040520           STA 0,CB,LC       ;ADRS TO STORE TSTS
26 04565 144000 CB,RL:    COM 2,1           ;-#WORDS TO MOV
27 04566 111000           MOV 0,2           ;TO ADRS
28 04567 034516           LDA 3,CB,BG       ;FROM ADRS
29 04570 021400 CB,L2:    LDA 0,0,3
30 04571 041000           STA 0,0,2
31 04572 175400           INC 3,3
32 04573 151400           INC 2,2
33 04574 125404           INC 1,1,SZR
34 04575 000773           JMP CB,L2         ;MOV ALL TO SCRTCH
35 04576 020516           LDA 0,CBPL2
36 04577 104000           COM 0,1
37 04600 143000           ADD 2,0
38 04601 101400           INC 0,0
39 04602 041377           STA 0,-1,2        ;SET EPROG
40 04603 020501           LDA 0,CB,LC
41 04604 041376           STA 0,-2,2        ;SET BPROG
42 04605 102400           SUB 0,0
43 04606 041374           STA 0,-4,2        ;CLR PONES
44 04607 050477           STA 2,CB,EN
45                ;MOV REST OF TEST INTO SCRATCH AREA
46 04610 034503           LDA 3,CBBG2       ;STRT OF 2ND SECTION
47 04611 021400 CB,L3:    LDA 0,0,3
48 04612 041000           STA 0,0,2
49 04613 151400           INC 2,2
50 04614 175400           INC 3,3
51 04615 125404           INC 1,1,SZR
52 04616 000773           JMP CB,L3
53                ;2ND PART OF TEST IS MOVED
```

```
10073 MPRTS
01
02                ;TEST PROGRAMS HAVE BEEN MOVED TO SCRATCH AREA
03                ;EXECUTE NEXT TES IN SEQUENCE
04 04617 030462 CB,03:  LDA 2,CB,TK       ;GET TEST COUNT
05 04620 024475         LDA 1,CB,TS       ;ADRS SEQ TABLE
06 04621 133000         ADD 1,2
07 04622 035000         LDA 3,0,2         ;GET RELATIVE POSITION
08 04623 024461         LDA 1,CB,LC       ;STRT POS IN SCRATCH
09 04624 137000         ADD 1,3
10 04625 050462         STA 2,CB,TI
11 04626 054463         STA 3,CB,SE
12 04627 005400         JSR 0,3 ;***GO TO TEST ***
13 04630 000414         JMP CB,04         ;NO ERROR RETURN
14                ;SKIP ON RETURN IS GROSS ERROR
15                ;FAST CHECKSUM OF MEMORY WAS NOT CORRECT
16                ;BUT THE SECOND PASS THROUGH THE DATA CHECK
17                ;DID NOT FIND ANY ERRORS IN PATTERN GENERATED
18 04631 020457         LDA 0,OTOTL       ;FAST SUM RESULT
19 04632 030454         LDA 2,CB,EN
20 04633 025374         LDA 1,-4,2        ;#-1'S GENERATED
21 04634 004416         JSR CB,ER
22                CB,X1:  LCALL RSCRA       ;RELEASE 1K SCRATCH
23 04635 060202         NIOC MAP
24 04636 006055         JSR @RSCRA
25 04637 102001         ADC 0,0,SKP       ;RET ALL RELEASED
26 04640 000775         JMP CB,X1         ;RELEASE ALL
27 04641 040440         STA 0,CB,TK       ;SET NO SCRATCH SW
28                      LCALL RETRN
29 04642 060202         NIOC MAP
30 04643 006061         JSR @RETRN
31                ;NORMAL RETURN FROM TEST SEE IF PASS COMPLETE
32 04644 010443 CB,04:  ISZ CB,TI
33 04645 022442         LDA 0,@CB,TI      ;NEXT IN SEQ
34 04646 100005         COM 0,0,SNR       ;#-1 WAS END SEQ
35 04647 000423         JMP CB,X2         ;AND RELEASE SCRA,
36                      LCALL RETRN
37 04650 060202         NIOC MAP
38 04651 006061         JSR @RETRN
```

```
10074 MPRTS
01                ;PATTERN CHECK FOUND AN ERROR
02 04652 054437 CB,ER:  STA 3,CB,SE
03                      LCALL ERROI
04 04653 060202         NIOC MAP
05 04654 006065         JSR @ERRCI
06 04655 000401 CB,EC:  JMP .+1 ;CONTINUE ERROR TYPEOUT
07 04656 020445         LDA 0,CBTXT
08                      LCALL ERRTX
09 04657 060202         NIOC MAP
10 04660 006060         JSR @ERRTX
11 04661 020420         LDA 0,CB,TK       ;TEST #
12 04662 024422         LDA 1,CB,LC       ;LOGICAL ADDRESS
13 04663 030426         LDA 2,CB,SE       ;START TEST OR E CALL
14                      LCALL ERROC
15 04664 060202         NIOC MAP
16 04665 006066         JSR @ERROC
17 04666 000747         JMP CB,X1         ;SW0=1 RELEASE SCRATCH
18 04667 102400         SUB 0,0           ;OTHERWISE HOLD IT
19 04670 040422         STA 0,CB,ES       ;AS IS UNTIL SW0=1
20 04671 000753         JMP CB,04
21
22 04672 020420 CB,X2:  LDA 0,CB,ES       ;GET ERR SWITCH
23 04673 040406         STA 0,CB,TK       ;-1 IS NO ERRS
24 04674 101004         MOV 0,0,SZR
25 04675 000441         JMP CB,05         ;AND SCRATCH IS RELEASED
26 04676 020406         LDA 0,CB,LC       ;OTHERWISE MOVE
27 04677 030404         LDA 2,CB,PL       ;PROGRAM UP AND
28 04700 000665         JMP CB,RL         ;RESTART AT TEST 0
```

```
10075 MPRTS
01
02 04701 000000 CB,TK: 0
03 04702 000037 CB,37: 37
04 04703 000151 CB,PL: EPROG-BEGIN
05 04704 000000 CB,LC: 0
06 04705 004760 CB,BG: BEGIN
07 04706 000000 CB,EN: 0
08 04707 000000 CB,TI: 0
09 04710 000000 OTOTL: 0
10 04711 000000 CB,SE: 0
11 04712 000000 CB,ES: 0
12 04713 005132 CBBG2: DISTUR
13 04714 000104 CBPL2: DIRET-DISTUR
14 04715 004716 CB,TS:  CB,TS+1 ;TEST SEQUENCE TABLE
15 04716 000000          BEGIN-BEGIN
16 04717 000152          DISTUR-BEGIN
17 04720 000045          ICHECK-BEGIN
18 04721 000101          CB,FA-BEGIN
19 04722 177777          -1
20 04723 004724 CBTXT: .+1
21 04724 005215          .TXTE (<15><12>CB.TK    CB.LC   CB.SE(
22       041303
23       152056
24       004513
25       041303
26       146056
27       004703
28       041303
29       051456
30       000305
```

```
10076 MPRTS
01               ;DETERMINE IF IT IS TIME TO SWAP MEMORY
02               ;CROSSOVER CONSTANTS
03               CB,05: LCALL ARANG
04 04736 060202          NIOC MAP
05 04737 006062          JSR @ARANG
06 04740 024557          LDA 1,C17
07 04741 123404          AND 1,0,SZR
08 04742 000673          JMP CB,X1
09 04743 020411          LDA 0,CB17
10 04744 030411          LDA 2,CB400
11 04745 106414          SUB# 0,1,SZR
12 04746 000403          JMP .+3
13 04747 020407          LDA 0,CB37
14 04750 030407          LDA 2,CB10K
15 04751 040546          STA 0,C17
16 04752 050544          STA 2,C400
17 04753 000662          JMP CB,X1
18 04754 000017 CB17: 17
19 04755 000400 CB400: 400
20 04756 000037 CB37: 37
21 04757 010000 CB10K: 10000
```

```
;0077 MPRTS
01
02                ;THE FOLLOWING SERIES OF TESTS ARE RELOCATED TO
03                ;SCRATCH AREA ASSIGNED FOR EXECUTION
04 04760 054532 BEGIN:  STA 3,RETURN
05 04761 102400         SUB 0,0
06 04762 040544         STA 0,PONES
07 04763 034106         LDA 3,SCRLO
08 04764 030527         LDA 2,C076000
09 04765 020107         LDA 0,SCRHI       ;3/0=LIMITS
10 04766 143400         AND 2,0           ;END DISTURB
11 04767 040526         STA 0,EDIST
12 04770 173400         AND 3,2
13 04771 050523         STA 2,MODUAL
14 04772 030106 IPAT:   LDA 2,SCRLO
15 04773 024523         LDA 1,C400
16 04774 020533         LDA 0,PATT        ;START PATTERN
17 04775 147404         AND 2,1,SZR
18 04776 100000 IPAT1:  COM 0,0
19 04777 024520         LDA 1,C17
20 05000 034530 FILL:   LDA 3,BPROG       ;AVOID OVERWRITE TST
21 05001 156436         SUBZ# 2,3,SEZ
22 05002 000404         JMP .+4
23 05003 034526         LDA 3,EPROG
24 05004 172433         SUBZ# 3,2,SNC     ;SKP>PROG END
25 05005 000405         JMP .+5
26 05006 041000         STA 0,0,2         ;STR PAT WORD
27 05007 034517         LDA 3,PONES
28 05010 117000         ADD 0,3
29 05011 054515         STA 3,PONES       ;ACCUMULATE CHKSUM
30 05012 151400         INC 2,2           ;FOR NXT STOR
31 05013 034506         LDA 3,C77
32 05014 133414         AND# 1,2,SZR      ;FILL FOR 16
33 05015 000763         JMP FILL
34 05016 157414         AND# 2,3,SZR      ;THEN COM PAT
35 05017 000757         JMP IPAT1         ;EVERY 64
36 05020 024107         LDA 1,SCRHI       ;TST FOR END
37 05021 125400         INC 1,1
38 05022 146434         SUBZ# 2,1,SZR
39 05023 000750         JMP IPAT+1
40 05024 002456         JMP @RETURN
```

```
;0078 MPRTS
01                ;CHECK PATTERN IN SCRATCH AREA AGAINST GENERATED
02 05025 054465 ICHECK: STA 3,RETURN
03 05026 030106         LDA 2,SCRLO       ;INIT PAT
04 05027 024467         LDA 1,C400
05 05030 020477         LDA 0,PATT
06 05031 133414         AND# 1,2,SZR
07 05032 100000 ICK:    COM 0,0
08 05033 024475         LDA 1,BPROG       ;DON'T CMP TST STOR
09 05034 146436         SUBZ# 2,1,SEZ
10 05035 000405         JMP CHECK
11 05036 024473         LDA 1,EPROG
12 05037 132436         SUBZ# 1,2,SEZ
13 05040 000402         JMP CHECK
14 05041 000404         JMP ECHECK-4
15 05042 025000 CHECK:  LDA 1,0,2         ;GET WORD FROM MEM
16 05043 106414         SLA# 0,1,SZR      ;SKP=
17 05044 006461         JSR @ERR1
18 05045 151400         INC 2,2
19 05046 024451         LDA 1,C17
20 05047 133414         AND# 1,2,SZR
21 05050 000763         JMP ICK+1
22 05051 034450 ECHECK: LDA 3,C77
23 05052 157414         AND# 2,3,SZR      ;CHK END OF LINE
24 05053 000757         JMP ICK
25 05054 024107         LDA 1,SCRHI
26 05055 125400         INC 1,1
27 05056 146434         SUBZ# 2,1,SZR     ;CHK END OF CORE
28 05057 000750         JMP ICHECK+2
29 05060 002432         JMP @RETLRN
```

```
10079 MPRTS
01
02                ;FAST CHECKSUM PATTERN SHOULD = THAT STORED
03 05061 054431 CB,FA:  STA 3,RETURN
04 05062 102400         SUB 0,0
05 05063 030106         LDA 2,SCRLO     ;BEGIN OF SCRA,
06 05064 034444         LDA 3,BPROG     ;START OF TST STORE
07 05065 156405 CB,F1:  SUB 2,3,SNR
08 05066 000407         JMP CB,F3
09 05067 174400         NEG 3,3 ;(3)=#WORDS TO ADD
10 05070 025000 CB,F2:  LDA 1,0,2       ;GET MRD
11 05071 123000         ADD 1,0         ;ACCUM SUM=1'S
12 05072 151400         INC 2,2
13 05073 175404         INC 3,3,SZR
14 05074 000774         JMP CB,F2
15 05075 034107 CB,F3:  LDA 3,SCRHI
16 05076 175400         INC 3,3
17 05077 156415         SUB# 2,3,SNR    ;DONE ALL CORE
18 05100 000403         JMP CB,F4       ;YES EXIT
19 05101 030430         LDA 2,EPROG
20 05102 000763         JMP CB,F1       ;ADD ABOVE TSTS
21 05103 024423 CB,F4:  LDA 1,PONES     ;(1)=#-1'S GEN
22 05104 122414         SUB#1,0,SZR     ;SHD BE=
23 05105 000402         JMP CB,F5       ;BUT AREN'T
24 05106 002404         JMP @RETURN
25 05107 010403 CB,F5:  ISZ RETURN      ;STEP EXIT
26 05110 042414         STA 0,@CB,WK    ;SAVE IN CASE
27 05111 000715         JMP ICHECK+1    ;CHECK CAN'T FIND ERR
28 05112 000000 RETURN: 0
29 05113 076000 C07600: 76000
30 05114 000000 MODUAL: 0
31 05115 000000 EDIST: 0
32 05116 000400 C400: 400
33 05117 000017 C17: 17
34 05120 000020 C20: 20
35 05121 000077 C77: 77
36 05122 001777 C1777: 1777
37 05123 000101 C101: 101
38 05124 004710 CB,WK: OTOTL
39 05125 004652 ERR1: CB,ER
40 05126 000000 PONES: 0
41 05127 000000 PATT: 0
42 05130 000000 BPROG: 0
43 05131 000000 EPROG: 0
```

```
10080 MPRTS
01
02
03                ;SHUFFLE MEM BY FLOATING A BIT OR NO BIT THROUGH 16 WORD
04 05132 054760 DISTUR: STA 3,RETURN
05 05133 030106         LDA 2,SCRLO
06 05134 145000 DISTL:  MOV 2,1         ;2=START OF 16
07 05135 020763         LDA 0,C20       ;MAKE 1=END+1
08 05136 107000         ADD 0,1
09 05137 034771         LDA 3,BPROG     ;START OR "BEGIN)
10 05140 136436         SUBZ# 1,3,SEZ   ;END 16>BEG
11 05141 000411         JMP DISDO       ;NO<DO THIS 16
12 05142 034767         LDA 3,EPROG     ;GET END PRG
13 05143 172436         SUBZ# 3,2,SEZ   ;STRT 16>END PRG
14 05144 000403         JMP ,+3         ;YES
15 05145 131000         MOV 1,2         ;TRY STRT NXT16
16 05146 000766         JMP DISTL
17 05147 034107         LDA 3,SCRHI
18 05150 106436         SUBZ# 3,1,SEZ   ;END 16>SCRHI
19 05151 002741         JMP @RETURN     ;YES EXIT JOB DONE
20 05152 004450 DISDO:  JSR DIXOR       ;FLT A 1 BIT 16 WORDS
21 05153 020745         LDA 0,C20
22 05154 112400         SUB 0,2         ;BACK TO START OF 16
23 05155 114400         NEG 0,3         ;SHUFFLE 16 TIMES
24 05156 021000 DISDL:  LDA 0,0,2       ;WORD 0
25 05157 025001         LDA 1,1,2
26 05160 041001         STA 0,1,2       ;GOES TO WORD 1
27 05161 021002         LDA 0,2,2
28 05162 045002         STA 1,2,2       ;1 GOES TO 2
29 05163 025003         LDA 1,3,2
30 05164 041003         STA 0,3,2       ;2 GOES TO 3
31 05165 021004         LDA 0,4,2
32 05166 045004         STA 1,4,2       ;3 GOES TO 4
33 05167 025005         LDA 1,5,2
34 05170 041005         STA 0,5,2       ;4 GOES TO 5
35 05171 021006         LDA 0,6,2
36 05172 045006         STA 1,6,2       ;5 GOES TO 6
37 05173 025007         LDA 1,7,2
38 05174 041007         STA 0,7,2       ;6 TO 7
39 05175 021010         LDA 0,10,2
40 05176 045010         STA 1,10,2      ;7 TO 10
41 05177 025011         LDA 1,11,2
42 05200 041011         STA 0,11,2      ;10 TO 11
43 05201 021012         LDA 0,12,2
44 05202 045012         STA 1,12,2      ;11 TO 12
45 05203 025013         LDA 1,13,2
46 05204 041013         STA 0,13,2      ;12 TO 13
47 05205 021014         LDA 0,14,2
48 05206 045014         STA 1,14,2      ;13 TO 14
49 05207 025015         LDA 1,15,2
50 05210 041015         STA 0,15,2      ;14 TO 15
51 05211 021016         LDA 0,16,2
52 05212 045016         STA 1,16,2      ;15 TO 16
53 05213 025017         LDA 1,17,2
54 05214 041017         STA 0,17,2      ;16 TO 17
55 05215 045000         STA 1,0,2       ;AND 17 BACK TO 0
56 05216 175404         INC 3,3,SZR     ;DONE 16 TIMES
57 05217 000737         JMP DISDL       ;WORDS NOT BACK TO ORIG YET
58 05220 004402         JSR DIXOR       ;XOR BITS BACK TO ORIG
59 05221 000713         JMP DISTL       ;DO REST OF SCRATCH
```

```
10081 MPRTS
01                      ;COMS A SINGLE  BIT IN EACH OF NEXT 16 WORDS
02 05222 054414 DIXOR:  STA 3,DIRET     ;THEN RESTORES TO ORIG
03 05223 102520         SUBZL 0,0       ;XOR 1 BIT
04 05224 025000         LDA 1,0,2       ;GET NEXT WRD
05 05225 135000         MOV 1,3         ;START BIT XOR
06 05226 117520         ANDZL 0,3       ;SO FLT BIT PAT
07 05227 107000         ADD 0,1         ;APPEARS IN THESE
08 05230 166400         SUB 3,1         ;16 WORDS
09 05231 045000         STA 1,0,2
10 05232 151400         INC 2,2
11 05233 101124         MOVZL 0,0,SZR   ;DONE ALL - POS BIT L1
12 05234 000770         JMP DIXOR+2
13 05235 002401         JMP @DIRET
14 05236 000000 DIRET:  0
```

```
10082 MPRTS
01
02
                        .TITL ARITH
04                  ;ARITHMETIC TEST MODIFIED TO RUN WITH LINKR
05                  ;MACRO DEF'S TO INTER COMMUNICATE FOLLOW
06                          .MACRO SETUP    ;INIT FOR LOOP
07                          LCALL SETUL
08                  %
09
10                          .MACRO LOOP     ;LOOP TO LAST SETUP
11                          LCALL LLOOP
12                  %
13
14                          .MACRO ERROR
15                          JSR .+2         ;ERROR
16                          JMP .+3         ;NO ERROR
17                          LCALL ERRET
18                  %
19
20
21                          .MACRO CALL
22                  %
23                          .MACRO XORA
24                          JSR XOR,0
25                  %
26                          .MACRO XOR1
27                          JSR XOR,1
28                  %
29                          .MACRO XOR2
30                          JSR XOR,2
31                  %
32                          .MACRO .DIVU
33                          JSR DIVU
34                  %
35                          .MACRO .MPYA
36                          JSR MPYA
37                  %
38                          .MACRO RANDOM
39                          LCALL FRANG
40                  %
41                          .MACRO SQRT
42                          JSR SQRT,
43                  %
44                          .MACRO SQ
45                          JSR SQ,
46                  %
47                          .MACRO .MPYU
48                          JSR MPYU
49                  %
```

```
10083 MPRTS
01
02
03                ;ARITH - DEFINE PARAMETERS TO LINKR
04                      NEXTT AT,00
05        005237 LMEML=.
06        000113          .LOC LPG0
07 00113 005240         AT,00
08        000114 LPG0=.
09        005237          .LOC LMEML
10 05237 000000         0       ;INTERRUPT TIMEOUT SWITCH
11 05240 005260 AT,00:  AT,01
12 05241 005263         AT,02
13 05242 000000         0
14 05243 000000         0
15 05244 177777         -1
16 05245 176000         176000
17 05246 005432         AT,EC
18 05247 005432         AT,EC
19                      .TXTE (
20 05250 151101 ARITHMETIC TEST(
21        152311
22        046510
23        152305
24        141711
25        152240
26        051705
27        000324
28                ;SET NO SCRATCH ASSIGNED SWITCH
29 05260 102000 AT,01:  ADC 0,0
30 05261 040475         STA 0,AT,TK
31 05262 001400         JMP 0,3
32
```

```
10084 MPRTS
01              ;EXECUTE ENTRY POINT GET SCRATCH IF NONE AVAIL
02
03 05263 010473 AT,02:  ISZ AT,TK       ;SKIP IS NO SCRATCH
04 05264 000473          JMP AT,03
05                       LCALL ASCRA     ;GET 1K SCRATCH
06 05265 060202          NIOC MAP
07 05266 006053          JSR @ASCRA
08 05267 000455          JMP AT,05      - ;EXIT NONE AVAILABLE
09 05270 102000          ADC 0,0
10 05271 040574          STA 0,AT,ES    ;SET NO ERR SWTCH
11                       LCALL ESCRA    ;TRY TO GET 1K MORE
12 05272 060202          NIOC MAP
13 05273 006054          JSR @ESCRA
14 05274 000401          JMP .+1        ;BUT USE 1K IF NO MORE AVAIL
15 05275 030575          LDA 2,AT,37
16 05276 150400          NEG 2,2        ;TRY RANDOM BETWEEN LIM 37 TRYS
17              AT,2L:   LCALL ARANG
18 05277 060202          NIOC MAP
19 05300 006062          JSR @ARANG
20 05301 024107          LDA 1,SCRHI
21 05302 103000          ADD 0,0
22 05303 101220          MOVZR 0,0      ;CLR BIT 0
23 05304 122032          ADCZ# 1,0,SZC
24 05305 000411          JMP AT,2A      ;GRTR THAN HILIM
25 05306 034560          LDA 3,AT,PL
26 05307 166400          SUB 3,1        ;ENOUGH ROOM
27 05310 122032          ADCZ# 1,0,SZC  ;TO RELOCATE UP
28 05311 162400          SUB 3,0        ;NO LOWER NUMBER
29 05312 024106          LDA 1,SCRLO
30 05313 125400          INC 1,1
31 05314 122432          SUBZ# 1,0,SZC
32 05315 000404          JMP AT,2B
33 05316 151404 AT,2A:   INC 2,2,SZR
34 05317 000760          JMP AT,2L
35 05320 121000          MOV 1,0
```

```
;00005 MPRTS
01
02
03                ;MOVE TESTS TO SELECTED AREA
04
05 05321 111000 AT.2B:  MOV 0,2          ;ADJUST SCRHI
06 05322 020544         LDA 0,AT.PL      ;SO THAT TESTS
07 05323 024107         LDA 1,SCRHI      ;WILL FIT
08 05324 106400         SUB 0,1          ;INTO SCRATCH
09 05325 132032         ADCZ# 1,2,SZC
10 05326 131000         MOV 1,2
11 05327 050540         STA 2,AT.LC      ;START ADRS IN SCRATCH
12 05330 024536 AT.RL:  LDA 1,AT.PL
13 05331 124000         COM 1,1          ;-# WORDS TO MOVE
14 05332 030535         LDA 2,AT.LC      ;TO
15 05333 034535         LDA 3,AT.BG      ;FROM
16 05334 021400 AT.L2:  LDA 0,0,3        ;MOVE LOOP
17 05335 041000         STA 0,0,2
18 05336 151400         INC 2,2
19 05337 175400         INC 3,3
20 05340 125404         INC 1,1,SZR
21 05341 000773         JMP AT.L2
22 05342 050527         STA 2,AT.EN
23 05343 000414         JMP AT.03
24 05344 102000 AT.05:  ADC 0,0
25 05345 040411         STA 0,AT.TK
26                AT.XI:  LCALL RETRN
27 05346 060202         NIOC MAP
28 05347 006061         JSR @RETRN
29                ;MAP OPTION DOES NOT EXIST GO DIRECT
30 05350 020517 AT.GD:  LDA 0,AT.LC
31 05351 040523         STA 0,AT.LA
32 05352 020106         LDA 0,SCRLO
33 05353 040520         STA 0,AT.LO
34 05354 040521         STA 0,AT.LP
35 05355 002517         JMP @AT.LA
36 05356 000000 AT.TK:  0
```

```
;00006 MPRTS
01
02
03                ;TESTS HAVE BEEN MOVED TO SCRATCH
04                ;AT.03 SELECTS LOGICAL PAGE ASSIGNMENT
05                ;AND INITIATES TEST VIA GSCRA
06
07 05357 020506 AT.03:  LDA 0,AT.ES      ;GET ERR SWITCH
08 05360 101005         MOV 0,0,SNR      ;SKIP IS NO ERR
09 05361 000420         JMP AT.04        ;USE PREV ASSIGN
10                      LCALL ARANG
11 05362 060202         NIOC MAP
12 05363 006062         JSR @ARANG
13 05364 105000         MOV 0,1
14 05365 030505         LDA 2,AT.37
15                      LCALL ADIVI
16 05366 060202         NIOC MAP
17 05367 006063         JSR @ADIVI
18 05370 040505         STA 0,AT.LP
19 05371 024476         LDA 1,AT.LC
20 05372 030106         LDA 2,SCRLO
21 05373 146400         SUB 2,1
22 05374 111300         MOVS 0,2
23 05375 153120         ADDZL 2,2
24 05376 050475         STA 2,AT.LO
25 05377 133000         ADD 1,2
26 05400 050474         STA 2,AT.LA
27 05401 020474 AT.04:  LDA 0,AT.LP      ;REMAP SCR TO HERE
28 05402 030472         LDA 2,AT.LA      ;STARTING LOGICAL ADRS
29 05403 024422         LDA 1,ATERR      ;1=ERROR RET ADDRS
30                      LCALL GSCRA      ;GO TO SCRATCH
31 05404 060202         NIOC MAP
32 05405 006056         JSR @GSCRA
33 05406 000742         JMP AT.GD        ;COULDNT REMAP GO DIRECT
34                ;RETURN TO NEXT LOC PASS COMPLETE NO ERRS
35 05407 020456         LDA 0,AT.ES      ;CHK FOR PREV ERR
36 05410 101004         MOV 0,0,SZR      ;SKP ON PREV ERR
37 05411 000403         JMP .+3          ;RELEASE ASSIGN
38 05412 040744         STA 0,AT.TK
39 05413 000733         JMP AT.XI
40                      LCALL ARANG      ;IF BITS 0 AND 1=1
41 05414 060202         NIOC MAP
42 05415 006062         JSR @ARANG
43 05416 103043         ADDO 0,0,SNC     ;RELEASE AND REMAP
44 05417 103003         ADD 0,0,SNC      ;IF EITHER =0 MAKE
45 05420 000773         JMP .-5          ;NEXT PASS SELECT NEW LP
46                AT.4A:  LCALL RSCRA
47 05421 060202         NIOC MAP
48 05422 006055         JSR @RSCRA
49 05423 000721         JMP AT.05        ;SET NO SCRATCH
50 05424 000775         JMP AT.4A
```

```
;0087 MPRTS
01
02
03                ;ERROR IN TEST DURING EXECUTION
04
05 05425 005426 ATERR:  ATERR+1
06 05426 054436         STA 3,ATS03       ;PRINT ERR HEADERS
07                      LCALL ERROI
08 05427 060202         NIOC MAP
09 05430 006065         JSR @ERROI
10 05431 000401         JMP .+1
11 05432 020444 AT,EC:  LDA 0,ATTX1
12                      LCALL ERRTX
13 05433 060202         NIOC MAP
14 05434 006060         JSR @ERRTX
15 05435 020432         LDA 0,AT,LC       ;FOLLOW UP WITH
16 05436 024435         LDA 1,AT,LO       ;TEST RELOC INFO
17 05437 030435         LDA 2,AT,LA
18                      LCALL ERROC
19 05440 060202         NIOC MAP
20 05441 006066         JSR @ERROC
21 05442 000401         JMP .+1
22 05443 020446         LDA 0,ATTX2
23                      LCALL ERRTX
24 05444 060202         NIOC MAP
25 05445 006060         JSR @ERRTX
26 05446 020416         LDA 0,ATS03       ;CONTINUE TYPE
27 05447 024426         LDA 1,AT,LP       ;RELOC
28 05450 111000         MOV 0,2
29 05451 034423         LDA 3,AT,LA
30 05452 172400         SUB 3,2
31 05453 034415         LDA 3,AT,BG
32 05454 173000         ADD 3,2           ;ERROR ADRS FROM AT,BG
33                      LCALL ERROC
34 05455 060202         NIOC MAP
35 05456 006066         JSR @ERROC
36 05457 000742         JMP AT,4A         ;SW0=1 RELEASE SCR
37 05460 102400         SUB 0,0
38 05461 040404         STA 0,AT,ES       ;SET ERR SW
39 05462 040674         STA 0,AT,TK       ;CLR TEST K
40 05463 000663         JMP AT,XI         ;RETURN TO LINKR
41
```

```
;0088 MPRTS
01 05464 000000 ATS03:  0
02 05465 000000 AT,ES:  0
03 05466 001672 AT,PL:  ATEND-MS1
04 05467 000000 AT,LC:  0
05 05470 005525 AT,BG:  MS1
06 05471 000000 AT,EN:  0
07 05472 000037 AT,37:  37
08 05473 000000 AT,LO:  0
09 05474 000000 AT,LA:  0
10 05475 000000 AT,LP:  0
11 05476 005477 ATTX1:  .+1
12 05477 005215         .TXTE (<15><12>AT,LC    AT,LO   AT,LA(
13       152101
14       146056
15       004703
16       152101
17       146056
18       004717
19       152101
20       146056
21       000101
22 05511 005512 ATTX2:  .+1
23 05512 005215         .TXTE (<15><12>ATS03    AT,LP   E ADRS(
24       152101
25       030123
26       004463
27       152101
28       146056
29       004520
30       120305
31       042101
32       051722
33       000000
```

```
10089 MPRTS
01
02
03                MS1:    SETUP           ;MISC TEST OF NEG/COM
04                        LCALL SETUL
05 05525 060202           NIOC MAP
06 05526 006067           JSR @SETUL
07                        RANDOM
08                        LCALL FRANG
09 05527 060202           NIOC MAP
10 05530 006071           JSR @FRANG
11 05531 104700           NEGS 0,1
12 05532 130342           COMOS 1,2,SZC
13 05533 142014           ADC# 2,0,SZR
14                        ERROR
15 05534 004402           JSR .+2         ;ERROR
16 05535 000403           JMP .+3         ;NO ERROR
17                        LCALL ERRET
18 05536 060202           NIOC MAP
19 05537 006072           JSR @ERRET
20                        LOOP
21                        LCALL LLOOP
22 05540 060202           NIOC MAP
23 05541 006070           JSR @LLOOP
24
25                ;MS2:
26                        SETUP           ;MISC TEST OF INC SWAPPED.
27                        LCALL SETUL
28 05542 060202           NIOC MAP
29 05543 006067           JSR @SETUL
30                        RANDOM
31                        LCALL FRANG
32 05544 060202           NIOC MAP
33 05545 006071           JSR @FRANG
34 05546 111700           INCS 0,2
35 05547 145323           MOVZS 2,1,SNC
36 05550 106314           ADCS# 0,1,SZR
37                        ERROR
38 05551 004402           JSR .+2         ;ERROR
39 05552 000403           JMP .+3         ;NO ERROR
40                        LCALL ERRET
41 05553 060202           NIOC MAP
42 05554 006072           JSR @ERRET
43                        LOOP
44                        LCALL LLOOP
45 05555 060202           NIOC MAP
46 05556 006070           JSR @LLOOP
47
```

```
10090 MPRTS
01                ;MS3:
02                        SETUP           ;MISC NEG TEST
03                        LCALL SETUL
04 05557 060202           NIOC MAP
05 05560 006067           JSR @SETLL
06 05561 102400           SUB 0,0
07 05562 100644           NEGOR 0,0,SZR
08                        ERROR
09 05563 004402           JSR .+2         ;ERROR
10 05564 000403           JMP .+3         ;NO ERROR
11                        LCALL ERRET
12 05565 060202           NIOC MAP
13 05566 006072           JSR @ERRET
14 05567 100664           NEGCR 0,0,SZR
15                        ERROR
16 05570 004402           JSR .+2         ;ERROR
17 05571 000403           JMP .+3         ;NO ERROR
18                        LCALL ERRET
19 05572 060202           NIOC MAP
20 05573 006072           JSR @ERRET
21 05574 100664           NEGCR 0,0,SZR
22                        ERROR
23 05575 004402           JSR .+2         ;ERROR
24 05576 000403           JMP .+3         ;NO ERROR
25                        LCALL ERRET
26 05577 060202           NIOC MAP
27 05600 006072           JSR @ERRET
28                        LOOP
29                        LCALL LLOOP
30 05601 060202           NIOC MAP
31 05602 006070           JSR @LLOOP
32
```

```
10091 MPRTS
01
02                ;ROT1:
03                        SETUP           ;TEST ROTATE LEFT
04                        LCALL SETUL
05 05603 060202           NIOC MAP
06 05604 006067           JSR @SETUL
07                        RANDOM
08                        LCALL FRANG
09 05605 060202           NIOC MAP
10 05606 006071           JSR @FRANG
11 05607 105000           MOV 0,1
12 05610 101100           MOVL 0,0
13 05611 111100           MOVL 0,2
14 05612 151100           MOVL 2,2
15 05613 151100           MOVL 2,2
16 05614 155100           MOVL 2,3
17 05615 175100           MOVL 3,3
18 05616 175100           MOVL 3,3
19 05617 161100           MOVL 3,0
20 05620 101100           MOVL 0,0
21 05621 101100           MOVL 0,0
22 05622 101100           MOVL 0,0
23 05623 101100           MOVL 0,0
24 05624 101100           MOVL 0,0
25 05625 101100           MOVL 0,0
26 05626 101100           MOVL 0,0
27 05627 101100           MOVL 0,0
28 05630 101100           MOVL 0,0
29 05631 106414           SUB# 0,1,SZR
30                        ERROR
31 05632 004402           JSR .+2         ;ERROR
32 05633 000403           JMP .+3         ;NO ERROR
33                        LCALL ERRET
34 05634 060202           NIOC MAP
35 05635 006072           JSR @ERRET
36                        LOOP
37                        LCALL LLOOP
38 05636 060202           NIOC MAP
39 05637 006070           JSR @LLOOP
```

```
10092 MPRTS
01
02
03                ;ROT2:
04                        SETUP           ;TEST ROTATE RIGHT
05                        LCALL SETUL
06 05640 060202           NIOC MAP
07 05641 006067           JSR @SETLL
08                        RANDOM
09                        LCALL FRANG
10 05642 060202           NIOC MAP
11 05643 006071           JSR @FRANG
12 05644 131000           MOV 1,2
13 05645 121200           MOVR 1,0
14 05646 101200           MOVR 0,0
15 05647 101200           MOVR 0,0
16 05650 101200           MOVR 0,0
17 05651 101200           MOVR 0,0
18 05652 101200           MOVR 0,0
19 05653 101200           MOVR 0,0
20 05654 101200           MOVR 0,0
21 05655 101200           MOVR 0,0
22 05656 101200           MOVR 0,0
23 05657 105200           MOVR 0,1
24 05660 125200           MOVR 1,1
25 05661 135200           MOVR 1,3
26 05662 175200           MOVR 3,3
27 05663 175200           MOVR 3,3
28 05664 161200           MOVR 3,0
29 05665 101200           MOVR 0,0
30 05666 112414           SUB# 0,2,SZR
31                        ERROR
32 05667 004402           JSR .+2         ;ERROR
33 05670 000403           JMP .+3         ;NO ERROR
34                        LCALL ERRET
35 05671 060202           NIOC MAP
36 05672 006072           JSR @ERRET
37                        LOOP
38                        LCALL LLOOP
39 05673 060202           NIOC MAP
40 05674 006070           JSR @LLOOP
```

```
10093 MPRTS
01
02                ;AND0:
03                        SETUP           ;ANY NUMBER ANDED WITH
04                        LCALL SETUL
05 05675 060202           NIOC MAP
06 05676 006067           JSR @SETUL
07                        RANDOM          ;ITSELF SHOULD NOT
08                        LCALL FRANG
09 05677 060202           NIOC MAP
10 05700 006071           JSR @FRANG
11 05701 131000           MOV 1,2         ;BE CHANGED.
12 05702 127700           ANDS 1,1
13 05703 127700           ANDS 1,1
14 05704 127700           ANDS 1,1
15 05705 127700           ANDS 1,1
16 05706 127700           ANDS 1,1
17 05707 135300           MOVS 1,3
18 05710 177700           ANDS 3,3
19 05711 177700           ANDS 3,3
20 05712 161300           MOVS 3,0
21 05713 103700           ANDS 0,0
22 05714 112414           SUB# 0,2,SZR
23                        ERROR
24 05715 004402           JSR .+2         ;ERROR
25 05716 000403           JMP .+3         ;NO ERROR
26                        LCALL ERRET
27 05717 060202           NIOC MAP
28 05720 006072           JSR @ERRET
29                        LOOP
30                        LCALL LLOOP
31 05721 060202           NIOC MAP
32 05722 006070           JSR @LLOOP
33
34                ;AND1:
35                        SETUP           ;A NUMBER ANDED WITH ITS
36                        LCALL SETUL
37 05723 060202           NIOC MAP
38 05724 006067           JSR @SETUL
39                        RANDOM          ;COMPLIMENT SHOULD
40                        LCALL FRANG
41 05725 060202           NIOC MAP
42 05726 006071           JSR @FRANG
43 05727 104042           COMO 0,1,SZC
44 05730 123704           ANDS 1,0,SZR    ;PRODUCE ZERO RESULT.
45                        ERROR
46 05731 004402           JSR .+2         ;ERROR
47 05732 000403           JMP .+3         ;NO ERROR
48                        LCALL ERRET
49 05733 060202           NIOC MAP
50 05734 006072           JSR @ERRET
51                        LOOP
52                        LCALL LLOOP
53 05735 060202           NIOC MAP
54 05736 006070           JSR @LLOOP
55
```

```
10094 MPRTS
01
02                ;AND3:
03                        SETUP           ;PERFORM A AND INSTRUCTION
04                        LCALL SETUL
05 05737 060202           NIOC MAP
06 05740 006067           JSR @SETUL
07                        RANDOM          ;WITH THE RESULT IN AC2.
08                        LCALL FRANG
09 05741 060202           NIOC MAP
10 05742 006071           JSR @FRANG
11 05743 176620           SLBZR 3,3       ;SIMULATE THE AND VIA
12 05744 131000           MOV 1,2         ;LOOKING FOR ADDER CARRY.
13 05745 113400           AND 0,2
14 05746 101113 AND3L:    MOVL# 0,0,SNC
15 05747 000403           JMP .+3
16 05750 125112           MOVL# 1,1,SZC
17 05751 101141           MOVOL 0,0,SKP
18 05752 101121           MOVZL 0,0,SKP
19 05753 125141           MOVOL 1,1,SKP
20 05754 125120           MOVZL 1,1
21 05755 175224           MOVZR 3,3,SZR
22 05756 000770           JMP AND3L
23 05757 106415           SUB# 0,1,SNR    ;CHECK IF AC0-1 ARE
24 05760 132414           SUB# 1,2,SZR    ;THE SAME AND IF THEY
25                        ERROR           ;ARGEE WITH INST.
26 05761 004402           JSR .+2         ;ERROR
27 05762 000403           JMP .+3         ;NO ERROR
28                        LCALL ERRET
29 05763 060202           NIOC MAP
30 05764 006072           JSR @ERRET
31                        LOOP
32                        LCALL LLOOP
33 05765 060202           NIOC MAP
34 05766 006070           JSR @LLOOP
```

```
10095 MPRTS
01
02                ;TEST PROCESSOR VIA EXCLUSIVE OR ROUTINES.
03
04                ;X1:
05                        SETUP           ;C(AC1) IS SAVED IN C(AC2).
06                        LCALL SETUL
07 05767 060202           NIOC MAP
08 05770 006067           JSR @SETUL
09                        RANDOM          ;AC0 IS EXCLUSIVE ORED
10                        LCALL FRANG
11 05771 060202           NIOC MAP
12 05772 006071           JSR @FRANG
13 05773 131000           MOV 1,2         ;WITH AC1 TWICE. THE SECOND
14                        CALL            ;EXCLUSIVE OR SHOULD
15                        XORA            ;RESTORE AC1 TO ITS
16 05774 004515           JSR XOR,0
17                        CALL            ;ORIGIONAL CONTENTS.
18                        XORA
19 05775 004514           JSR XOR,0
20 05776 132414           SUB# 1,2,SZR
21                        ERROR
22 05777 004402           JSR .+2         ;ERROR
23 06000 000403           JMP .+3         ;NO ERROR
24                        LCALL ERRET
25 06001 060202           NIOC MAP
26 06002 006072           JSR @ERRET
27                        LOOP
28                        LCALL LLOOP
29 06003 060202           NIOC MAP
30 06004 006070           JSR @LLOOP
31
32                ;X2:
33                        SETUP           ;THE FIRST EXCLUSIVE OR
34                        LCALL SETUL
35 06005 060202           NIOC MAP
36 06006 006067           JSR @SETUL
37                        RANDOM          ;ROUTINE EXCHANGES THE
38                        LCALL FRANG
39 06007 060202           NIOC MAP
40 06010 006071           JSR @FRANG
41                        CALL            ;CONTENTS
42                        XOR2            ;OF AC0 AND AC1, IT ALSO
43 06011 004516           JSR XOR,2
44                        CALL            ;FORMS THE EXCLUSIVE OR
45                        XOR1            ;IN AC2. THE SECOND EXCLUSIVE
46 06012 004505           JSR XOR,1
47 06013 112414           SUB# 0,2,SZR    ;OR FORMS THE RESULT
48                        ERROR           ;OF AC0=AC1 IN AC0.
49 06014 004402           JSR .+2         ;ERROR
50 06015 000403           JMP .+3         ;NO ERROR
51                        LCALL ERRET
52 06016 060202           NIOC MAP
53 06017 006072           JSR @ERRET
54                        LOOP
55                        LCALL LLOOP
56 06020 060202           NIOC MAP
57 06021 006070           JSR @LLOOP
```

```
10096 MPRTS
01
02                ;X3:
03                        SETUP           ;SAVE C(AC1) NEGATED IN
04                        LCALL SETUL
05 06022 060202           NIOC MAP
06 06023 006067           JSR @SETUL
07                        RANDOM          ;C(AC2). EXCLUSIVE OR C(AC0) TO
08                        LCALL FRANG
09 06024 060202           NIOC MAP
10 06025 006071           JSR @FRANG
11 06026 130400           NEG 1,2         ;C(AC1). EXCLUSIVE OR THE
12                        CALL            ;RESULT BACK TO AC0.
13                        XORA            ;CHECK VIA ADDITION TO
14 06027 004462           JSR XOR,0
15                        CALL            ;COMPLIMENT OF ORIGIONAL
16                        XOR1            ;NUMBER.
17 06030 004467           JSR XOR,1
18 06031 113014           ADD# 0,2,SZR
19                        ERROR
20 06032 004402           JSR .+2         ;ERROR
21 06033 000403           JMP .+3         ;NO ERROR
22                        LCALL ERRET
23 06034 060202           NIOC MAP
24 06035 006072           JSR @ERRET
25                        LOOP
26                        LCALL LLOOP
27 06036 060202           NIOC MAP
28 06037 006070           JSR @LLOOP
29
30                ;X4:
31                        SETUP           ;EXCLUSIVE OR C(AC0) TO
32                        LCALL SETUL
33 06040 060202           NIOC MAP
34 06041 006067           JSR @SETUL
35                        RANDOM          ;ALL ZEROS IN C(AC1).
36                        LCALL FRANG
37 06042 060202           NIOC MAP
38 06043 006071           JSR @FRANG
39 06044 126400           SUB 1,1
40                        CALL
41                        XORA
42 06045 004444           JSR XOR,0
43 06046 106414           SUB# 0,1,SZR
44                        ERROR
45 06047 004402           JSR .+2         ;ERROR
46 06050 000403           JMP .+3         ;NO ERROR
47                        LCALL ERRET
48 06051 060202           NIOC MAP
49 06052 006072           JSR @ERRET
50                        LOOP
51                        LCALL LLOOP
52 06053 060202           NIOC MAP
53 06054 006070           JSR @LLOOP
```

```
10097 MPRTS
01
02                ;X5:
03                        SETUP           ;EXCLUSIVE OR C(AC1) TO
04                        LCALL SETUL
05 06055 060202           NIOC MAP
06 06056 006067           JSR @SETUL
07                        RANDOM          ;ALL ZEROS IN C(AC0).
08                        LCALL FRANG
09 06057 060202           NIOC MAP
10 06060 006071           JSR @FRANG
11 06061 102400           SUB 0,0
12                        CALL
13                        XOR1
14 06062 004435           JSR XOR,1
15 06063 106414           SUB# 0,1,SZR
16                        ERROR
17 06064 004402           JSR .+2         ;ERROR
18 06065 000403           JMP .+3         ;NO ERROR
19                        LCALL ERRET
20 06066 060202           NIOC MAP
21 06067 006072           JSR @ERRET
22                        LOOP
23                        LCALL LLOOP
24 06070 060202           NIOC MAP
25 06071 006070           JSR @LLOOP
26
27                ;X6:
28                        SETUP           ;EXCLUSIVE OR C(AC1) TO
29                        LCALL SETUL
30 06072 060202           NIOC MAP
31 06073 006067           JSR @SETUL
32                        RANDOM          ;(-1) IN C(AC0).
33                        LCALL FRANG
34 06074 060202           NIOC MAP
35 06075 006071           JSR @FRANG
36 06076 102000           ADC 0,0         ;THE COMPLIMENT OF
37                        CALL            ;THIS RESULT SHOULD
38                        XOR1            ;EQUAL C(AC1).
39 06077 004420           JSR XOR,1
40 06100 110000           COM 0,2
41 06101 146414           SUB# 2,1,SZR
42                        ERROR
43 06102 004402           JSR .+2         ;ERROR
44 06103 000403           JMP .+3         ;NO ERROR
45                        LCALL ERRET
46 06104 060202           NIOC MAP
47 06105 006072           JSR @ERRET
48                        LOOP
49                        LCALL LLOOP
50 06106 060202           NIOC MAP
51 06107 006070           JSR @LLOOP
52 06110 000436           JMP X7
```

```
10098 MPRTS
01
02 06111 054433 XOR,0:    STA 3,XOR,4
03 06112 135000           MOV 1,3         ;EXCLUSIVE OR C(AC0),C(AC1).
04 06113 117520           ANDZL 0,3       ;RESULT IS IN C(AC1).
05 06114 107000           ADD 0,1
06 06115 166400           SUB 3,1
07 06116 002426           JMP @XOR,4
08
09 06117 054425 XOR,1:    STA 3,XOR,4
10 06120 135000           MOV 1,3         ;EXCLUSIVE OR C(AC0),C(AC1).
11 06121 117400           AND 0,3         ;RESULT IS IN C(AC0).
12 06122 174000           COM 3,3
13 06123 163400           AND 3,0
14 06124 123000           ADD 1,0
15 06125 163400           AND 3,0
16 06126 002416           JMP @XOR,4
17
18 06127 054415 XOR,2:    STA 3,XOR,4
19 06130 034415           LDA 3,XM20      ;EXCLUSIVE OR C(AC0),C(AC1).
20 06131 054412           STA 3,XORTEM    ;RESULT IN C(AC2).
21 06132 115000           MOV 0,3         ;THE CONTENTS OF AC0 AND
22 06133 137200           ADDR 1,3        ;AC1 ARE EXCHANGED.
23 06134 151200           MOVR 2,2
24 06135 101220           MOVZR 0,0
25 06136 125200           MOVR 1,1
26 06137 103200           ADDR 0,0
27 06140 010403           ISZ XORTEM
28 06141 000771           JMP XOR,2+3
29 06142 002402           JMP @XOR,4
30 06143 000000 XORTEM: 0
31 06144 000000 XOR,4: 0
32 06145 177760 XM20: -20
```

```
10099 MPRTS
01
02                X7:     SETUP           ;C(AC1) IS SET EQUAL TO
03                        LCALL SETUL
04 06146 060202           NIOC MAP
05 06147 006067           JSR @SETLL
06                        RANDOM          ;C(AC0), C(AC0) AND C(AC1)
07                        LCALL FRANG
08 06150 060202           NIOC MAP
09 06151 006071           JSR @FRANG
10 06152 105000           MOV 0,1         ;ARE EXCLUSIVE ORED WITH
11                        CALL            ;THE RESULT GOING TO AC2.
12                        XOR2
13 06153 004754           JSR XOR,2
14 06154 151004           MOV 2,2,SZR
15                        ERROR
16 06155 004402           JSR .+2         ;ERROR
17 06156 000403           JMP .+3         ;NO ERROR
18                        LCALL ERRET
19 06157 060202           NIOC MAP
20 06160 006072           JSR @ERRET
21                        LOOP
22                        LCALL LLOOP
23 06161 060202           NIOC MAP
24 06162 006070           JSR @LLOOP
25
26                ;X8:
27                        SETUP           ;C(AC0) IS SET TO THE
28                        LCALL SETUL
29 06163 060202           NIOC MAP
30 06164 006067           JSR @SETLL
31                        RANDOM          ;COMPLIMENT OF C(AC1). THE
32                        LCALL FRANG
33 06165 060202           NIOC MAP
34 06166 006071           JSR @FRANG
35 06167 120000           COM 1,0         ;RESULT OF A EXCLUSIVE OR
36                        CALL            ;SHOULD BE ALL BITS
37                        XOR2            ;SET (=1).
38 06170 004737           JSR XOR,2
39 06171 150014           COM# 2,2,SZR
40                        ERROR
41 06172 004402           JSR .+2         ;ERROR
42 06173 000403           JMP .+3         ;NO ERROR
43                        LCALL ERRET
44 06174 060202           NIOC MAP
45 06175 006072           JSR @ERRET
46                        LOOP
47                        LCALL LLOOP
48 06176 060202           NIOC MAP
49 06177 006070           JSR @LLOOP
```

```
10100 MPRTS
01
02                ;X9:
03                        SETUP           ;EXCLUSIVE OR ALL ONES
04                        LCALL SETUL
05 06200 060202           NIOC MAP
06 06201 006067           JSR @SETLL
07 06202 102300           ADCS 0,0        ;TO ALL ONES, THE
08 06203 126000           ADC 1,1         ;RESULT SHOULD BE
09                        CALL            ;ALL ZEROS.
10                        XORA
11 06204 004705           JSR XOR,0
12 06205 127704           ANDS 1,1,SZR
13                        ERROR
14 06206 004402           JSR .+2         ;ERROR
15 06207 000403           JMP .+3         ;NO ERROR
16                        LCALL ERRET
17 06210 060202           NIOC MAP
18 06211 006072           JSR @ERRET
19                        LOOP
20                        LCALL LLOOP
21 06212 060202           NIOC MAP
22 06213 006070           JSR @LLOOP
23
24                ;X10:
25                        SETUP           ;EXCLUSIVE OR ALL ZEROS
26                        LCALL SETUL
27 06214 060202           NIOC MAP
28 06215 006067           JSR @SETLL
29 06216 102700           SUBS 0,0        ;TO ALL ZEROS, THE
30 06217 126400           SUB 1,1         ;RESULT SHOULD BE
31                        CALL            ;ALL ZEROS IN C(AC1).
32                        XORA
33 06220 004671           JSR XOR,0
34 06221 107314           ADDS# 0,1,SZR
35                        ERROR
36 06222 004402           JSR .+2         ;ERROR
37 06223 000403           JMP .+3         ;NO ERROR
38                        LCALL ERRET
39 06224 060202           NIOC MAP
40 06225 006072           JSR @ERRET
41                        LOOP
42                        LCALL LLOOP
43 06226 060202           NIOC MAP
44 06227 006070           JSR @LLOOP
```

```
10101 MPRTS
01
02                ;X11:
03                        SETUP           ;FORM EXCLUSIVE OF FUNCTION
04                        LCALL SETUL
05 06230 060202           NIOC MAP
06 06231 006067           JSR @SETUL
07                        RANDOM          ;IN C(AC2).
08                        LCALL FRANG
09 06232 060202           NIOC MAP
10 06233 006071           JSR @FRANG
11                        CALL            ;CALL ANOTHER EXCLUSIVE
12                        XOR2            ;OR FUNCTION SEVEN TIMES.
13 06234 004673           JSR XOR,2
14                        CALL            ;THE RESULT SHOULD BE THE
15                        XORA            ;SAME AS THE FIRST XORA
16 06235 004654           JSR XOR,0
17                        CALL
18                        XORA
19 06236 004653           JSR XOR,0
20                        CALL
21                        XORA
22 06237 004652           JSR XOR,0
23                        CALL
24                        XORA
25 06240 004651           JSR XOR,0
26                        CALL
27                        XORA
28 06241 004650           JSR XOR,0
29                        CALL
30                        XORA
31 06242 004647           JSR XOR,0
32                        CALL
33                        XORA
34 06243 004646           JSR XOR,0
35 06244 132414           SUB# 1,2,SZR
36                        ERROR
37 06245 004402           JSR .+2         ;ERROR
38 06246 000403           JMP .+3         ;NO ERROR
39                        LCALL ERRET
40 06247 060202           NIOC MAP
41 06250 006072           JSR @ERRET
42                        LOOP
43                        LCALL LLOOP
44 06251 060202           NIOC MAP
45 06252 006070           JSR @LLOOP
46
47 06253 000402           JMP A1
48 06254 000635 XOR,L:  JMP XOR,0
```

```
10102 MPRTS
01
02                A1:     SETUP           ;SAVE C(AC2) IN C(AC1).
03                        LCALL SETUL
04 06255 060202           NIOC MAP
05 06256 006067           JSR @SETUL
06                        RANDOM          ;ADD AND ADD C(AC0) TO
07                        LCALL FRANG
08 06257 060202           NIOC MAP
09 06260 006071           JSR @FRANG
10 06261 145000           MOV 2,1         ;C(AC2). THE VALUE IN
11 06262 112400           SUB 0,2         ;AC2 SHOULD NOT BE
12 06263 113000           ADD 0,2         ;CHANGED.
13 06264 146414           SUB# 2,1,SZR
14                        ERROR
15 06265 004402           JSR .+2         ;ERROR
16 06266 000403           JMP .+3         ;NO ERROR
17                        LCALL ERRET
18 06267 060202           NIOC MAP
19 06270 006072           JSR @ERRET
20                        LOOP
21                        LCALL LLOOP
22 06271 060202           NIOC MAP
23 06272 006070           JSR @LLOOP
24
25                ;A21:
26                        SETUP
27                        LCALL SETUL
28 06273 060202           NIOC MAP
29 06274 006067           JSR @SETUL
30                        RANDOM
31                        LCALL FRANG
32 06275 060202           NIOC MAP
33 06276 006071           JSR @FRANG
34 06277 102000           ADC 0,0
35 06300 123000           ADD 1,0
36 06301 111400           INC 0,2
37 06302 146414           SUB# 2,1,SZR
38                        ERROR
39 06303 004402           JSR .+2         ;ERROR
40 06304 000403           JMP .+3         ;NO ERROR
41                        LCALL ERRET
42 06305 060202           NIOC MAP
43 06306 006072           JSR @ERRET
44                        LOOP
45                        LCALL LLOOP
46 06307 060202           NIOC MAP
47 06310 006070           JSR @LLOOP
```

```
10103 MPRTS
01                ;A3:
02                        SETUP           ;INCREMENT THE VALUE IN
03                        LCALL SETUL
04 06311 060202           NIOC MAP
05 06312 006067           JSR @SETUL
06                        RANDOM          ;AC1 AND ADD THAT VALUE
07                        LCALL FRANG
08 06313 060202           NIOC MAP
09 06314 006071           JSR @FRANG
10 06315 131460           INCC 1,2        ;TO (-1). THE RESULT
11 06316 102360           ADDCS 0,0       ;SHOULD BE THE ORIGIONAL
12 06317 143060           ADDC 2,0        ;NUMBER.
13 06320 106414           SUB# 0,1,SZR
14                        ERROR
15 06321 004402           JSR .+2         ;ERROR
16 06322 000403           JMP .+3         ;NO ERROR
17                        LCALL ERRET
18 06323 060202           NIOC MAP
19 06324 006072           JSR @ERRET
20                        LOOP
21                        LCALL LLOOP
22 06325 060202           NIOC MAP
23 06326 006070           JSR @LLOOP
24                ;A4:
25                        SETUP           ;SAVE THE C(AC1) IN C(AC0).
26                        LCALL SETUL
27 06327 060202           NIOC MAP
28 06330 006067           JSR @SETUL
29                        RANDOM          ;A "ADDR" INSTRUCTION SHOULD
30                        LCALL FRANG
31 06331 060202           NIOC MAP
32 06332 006071           JSR @FRANG
33 06333 121020           MOVZ 1,0        ;NOT CHANGE THE VALUE OF
34 06334 127200           ADDR 1,1        ;THE AC.
35 06335 127200           ADDR 1,1
36 06336 127200           ADDR 1,1
37 06337 127200           ADDR 1,1
38 06340 127200           ADDR 1,1
39 06341 127200           ADDR 1,1
40 06342 127200           ADDR 1,1
41 06343 127200           ADDR 1,1
42 06344 127200           ADDR 1,1
43 06345 127200           ADDR 1,1
44 06346 127200           ADDR 1,1
45 06347 127200           ADDR 1,1
46 06350 127200           ADDR 1,1
47 06351 127200           ADDR 1,1
48 06352 106454           SUB0# 0,1,SZR
49                        ERROR
50 06353 004402           JSR .+2         ;ERROR
51 06354 000403           JMP .+3         ;NO ERROR
52                        LCALL ERRET
53 06355 060202           NIOC MAP
54 06356 006072           JSR @ERRET
55                        LOOP
56                        LCALL LLOOP
57 06357 060202           NIOC MAP
58 06360 006070           JSR @LLOOP
```

```
10104 MPRTS
01
02                ;A5:
03                        SETUP           ;THE RANDOM NUMBER IN
04                        LCALL SETUL
05 06361 060202           NIOC MAP
06 06362 006067           JSR @SETUL
07                        RANDOM          ;C(AC2) IS INCREMENTED VIA "INC"
08                        LCALL FRANG
09 06363 060202           NIOC MAP
10 06364 006071           JSR @FRANG
11 06365 115400           INC 0,3         ;AND DECREMENTED VIA "ADD".
12 06366 126000           ADC 1,1         ;THE FINAL RESULT IN C(AC2)
13 06367 137000           ADD 1,3         ;SHOULD BE EQUAL TO THE
14 06370 175400           INC 3,3         ;ORIGIONAL NUMBER IN C(AC0).
15 06371 137000           ADD 1,3
16 06372 171400           INC 3,2
17 06373 133000           ADD 1,2
18 06374 151400           INC 2,2
19 06375 133000           ADD 1,2
20 06376 142414           SUB# 2,0,SZR
21                        ERROR
22 06377 004402           JSR .+2         ;ERROR
23 06400 000403           JMP .+3         ;NO ERROR
24                        LCALL ERRET
25 06401 060202           NIOC MAP
26 06402 006072           JSR @ERRET
27                        LOOP
28                        LCALL LLOOP
29 06403 060202           NIOC MAP
30 06404 006070           JSR @LLOOP
```

```
10105 MPRTS
01
02                ;A6:
03                        SETUP           ;THE SUM OF AC0=1 IS
04                        LCALL SETUL
05 06405 060202           NIOC MAP
06 06406 006067           JSR @SETUL
07                        RANDOM          ;CHECKED WITH THE SIMULATED
08                        LCALL FRANG
09 06407 060202           NIOC MAP
10 06410 006071           JSR @FRANG
11 06411 135000           MOV 1,3         ;SUM.
12 06412 117000           ADD 0,3
13 06413 054432           STA 3,ADDTEM    ;SUM VIA ADD INSTRUCTION.
14 06414 131000 A6L:      MOV 1,2
15                        CALL
16 06415 004637           JSR XOR,L               ;SIMULATE THE ADD VIA
17 06416 143524           ANDZL 2,0,SZR   ;EXCLUSIVE OR. C(AC2)=
18 06417 000775           JMP A6L         ;RIPPLE CARRY,C(AC1)=RESULT.
19 06420 020425           LDA 0,ADDTEM
20 06421 122414           SUB# 1,0,SZR
21                        ERROR
22 06422 004402           JSR .+2         ;ERROR
23 06423 000403           JMP .+3         ;NO ERROR
24                        LCALL ERRET
25 06424 060202           NIOC MAP
26 06425 006072           JSR @ERRET
27                        LOOP
28                        LCALL LLOOP
29 06426 060202           NIOC MAP
30 06427 006070           JSR @LLOOP
31
32                ;A7:
33                        SETUP           ;ADDITION OF NEGATED
34                        LCALL SETUL
35 06430 060202           NIOC MAP
36 06431 006067           JSR @SETUL
37                        RANDOM          ;NUMBERS SHOULD PRODUCE
38                        LCALL FRANG
39 06432 060202           NIOC MAP
40 06433 006071           JSR @FRANG
41 06434 110440           NEGO 0,2        ;ZERO AND A CARRY.
42 06435 143204           ADDR 2,0,SZR
43                        ERROR
44 06436 004402           JSR .+2         ;ERROR
45 06437 000403           JMP .+3         ;NO ERROR
46                        LCALL ERRET
47 06440 060202           NIOC MAP
48 06441 006072           JSR @ERRET
49                        LOOP
50                        LCALL LLOOP
51 06442 060202           NIOC MAP
52 06443 006070           JSR @LLOOP
53
54 06444 101001           MOV 0,0,SKP
55 06445 177777 ADDTEM:   -1
```

```
10106 MPRTS
01
02                ;A8:
03                        SETUP           ;ADD TEST.
04                        LCALL SETUL
05 06446 060202           NIOC MAP
06 06447 006067           JSR @SETUL
07                        RANDOM
08                        LCALL FRANG
09 06450 060202           NIOC MAP
10 06451 006071           JSR @FRANG
11 06452 152520           SUBZL 2,2       ;=(+1)
12 06453 151300           MOVS 2,2        ;=(400)
13 06454 150400           NEG 2,2         ;=(177400)
14 06455 143700           ANDS 2,0        ;SAVE HIGH ORDER 8 BITS.
15 06456 105320           MOVZS 0,1       ;SAME 8 BITS TO C(AC1)L.
16 06457 103100           ADDL 0,0        ;MOVE C(AC0) LEFT VIA
17 06460 103100           ADDL 0,0        ;ADD SHIFT.
18 06461 103100           ADDL 0,0
19 06462 103100           ADDL 0,0
20 06463 106414           SUB# 0,1,SZR
21                        ERROR
22 06464 004402           JSR .+2         ;ERROR
23 06465 000403           JMP .+3         ;NO ERROR
24                        LCALL ERRET
25 06466 060202           NIOC MAP
26 06467 006072           JSR @ERRET
27                        LOOP
28                        LCALL LLOOP
29 06470 060202           NIOC MAP
30 06471 006070           JSR @LLOOP
31
```

```
10107 MPRTS
01
02
03 06472 101001          MOV 0,0,SKP
04 06473 177400 M4001:   -400
05               ;AR1:
06                       SETUP           ;THE ORIGIONAL CONTENTS OF
07                       LCALL SETUL
08 06474 060202          NIOC MAP
09 06475 006067          JSR @SETLL
10                       RANDOM          ;AC1, BITS 0-7 ARE SQUARED
11                       LCALL FRANG
12 06476 060202          NIOC MAP
13 06477 006071          JSR @FRANG
14 06500 030773          LDA 2,M4@0      ;VIA MULTIPLY, THE SQUARE
15 06501 133700          ANDS 1,2        ;ROOT OF THE PRODUCT SHOULD
16 06502 145000          MOV 2,1         ;EQUAL THE ORIGIONAL.
17                       CALL
18                       .MPYU           ;SEE SYSTEM REFFERANCE
19 06503 004454          JSR MPYU
20 06504 121000          MOV 1,0         ;MANUAL FOR FURTHER INFORMATION
21                       CALL            ;ON MULTIPLY/SQ ROOT
22                       SQRT            ;PROGRAMS.
23 06505 004501          JSR SQRT,
24 06506 112414          SUB# 0,2,SZR
25                       ERROR
26 06507 004402          JSR .+2         ;ERROR
27 06510 000403          JMP .+3         ;NO ERROR
28                       LCALL ERRET
29 06511 060202          NIOC MAP
30 06512 006072          JSR @ERRET
31                       LOOP
32                       LCALL LLOOP
33 06513 060202          NIOC MAP
34 06514 006070          JSR @LLOOP
```

```
10108 MPRTS
01
02               ;AR2:
03                       SETUP           ;TAKE THE SQUARE ROOT
04                       LCALL SETUL
05 06515 060202          NIOC MAP
06 06516 006067          JSR @SETLL
07                       RANDOM          ;OF A NUMBER, THE SQUARE
08                       LCALL FRANG
09 06517 060202          NIOC MAP
10 06520 006071          JSR @FRANG
11                       CALL            ;ROOT OF THE RESULT SQUARED
12                       SQRT            ;SHOULD BE THE SAME AS THE
13 06521 004465          JSR SQRT,
14 06522 105060          MOVC 0,1        ;ORIGIONAL ROOT.
15 06523 131060          MOVC 1,2
16                       CALL
17                       .MPYU
18 06524 004433          JSR MPYU
19 06525 121000          MOV 1,0
20                       CALL            ;SQUARED NOW TAKE ROOT.
21                       SQ
22 06526 004470          JSR SQ,
23 06527 112714          SUBS# 0,2,SZR
24                       ERROR
25 06530 004402          JSR .+2         ;ERROR
26 06531 000403          JMP .+3         ;NO ERROR
27                       LCALL ERRET
28 06532 060202          NIOC MAP
29 06533 006072          JSR @ERRET
30                       LOOP
31                       LCALL LLOOP
32 06534 060202          NIOC MAP
33 06535 006070          JSR @LLOOP
```

```
10109 MPRTS
01
02                ;AR3:
03                        SETUP           ;FIND SQUARE ROOT VIA
04                        LCALL SETUL
05 06536 060202           NIOC MAP
06 06537 006067           JSR @SETUL
07                        RANDOM          ;DIFFIRENT SUBROUTINES.
08                        LCALL FRANG
09 06540 060202           NIOC MAP
10 06541 006071           JSR @FRANG
11 06542 141000           MOV 2,0
12                        CALL
13                        SQRT
14 06543 004443           JSR SQRT.
15 06544 105000           MOV 0,1         ;SAVE FIRST RESULT IN AC1
16 06545 141000           MOV 2,0
17                        CALL
18                        SQ              ;RESULT IN AC0.
19 06546 004450           JSR SQ.
20 06547 106714           SUBS# 0,1,SZR
21                        ERROR
22 06550 004402           JSR .+2         ;ERROR
23 06551 000403           JMP .+3         ;NO ERROR
24                        LCALL ERRET
25 06552 060202           NIOC MAP
26 06553 006072           JSR @ERRET
27                        LOOP
28                        LCALL LLOOP
29 06554 060202           NIOC MAP
30 06555 006070           JSR @LLOOP
31 06556 000455           JMP AR4
```

```
10110 MPRTS
01
02 06557 102460 MPYU:   SUBC 0,0        ;C(AC1)*C(AC2)
03 06560 054411 MPYA:   STA 3,.CB03     ;RESULT IN AC0,AC1.
04 06561 034411         LDA 3,.CB20     ;SEE SYSTEM REFFERANCE
05 06562 125203 .CB99:  MOVR 1,1,SNC    ;MANUAL FOR FURTHER
06 06563 101201         MOVR 0,0,SKP    ;INFORMATION.
07 06564 143220         ADDZR 2,0
08 06565 175404         INC 3,3,SZR
09 06566 000774         JMP .CB99
10 06567 125260         MOVCR 1,1
11 06570 002401         JMP @.CB03
12 06571 000000 .CB03:  0
13 06572 177760 .CB20:  -20
14
15 06573 102400 DIVI:   SUB 0,0         ;C(AC0),C(AC1)/C(AC2).
16 06574 054775 DIVU:   STA 3,.CB03     ;AC0=REMAINDER
17 06575 034775         LDA 3,.CB20     ;AC1=QUOTIENT
18 06576 125120         MOVZL 1,1       ;SEE SYSTEM REFFERANCE
19 06577 101100 .CC98:  MOVL 0,0        ;MANUAL.
20 06600 142412         SUB# 2,0,SZC
21 06601 142400         SUB 2,0
22 06602 125100         MOVL 1,1
23 06603 175404         INC 3,3,SZR
24 06604 000773         JMP .CC98
25 06605 002764         JMP @.CB03
26
```

```
↓0111 MPRTS
01
02 06606 054423 SQRT,:  STA 3,SQ,S3
03 06607 126520          SUBZL 1,1          ;FIND SQ ROOT OF C(AC0).
04 06610 135120          MOVZL 1,3          ;SEE THE SYSTEM REFFERANCE
05 06611 122422          SUBZ 1,0,SZC       ;MANUAL.
06 06612 167001          ADD 3,1,SKP        ;RESULT IN AC0.
07 06613 121221          MOVZR 1,0,SKP      ;AC1 DESTROYED.
08 06614 000775          JMP .-3
09 06615 002414          JMP @SQ,S3
10
11 06616 054413 SQ,:     STA 3,SQ,S3
12 06617 176400          SUB 3,3            ;FIND SQ ROOT OF C(AC0).
13 06620 054412          STA 3,SQTEM        ;SAME RESULT AS PREVIOUS
14 06621 162023          ADCZ 3,0,SNC       ;TEST BUT CODE IS
15 06622 000405          JMP SQ1            ;DIFFIRENT.
16 06623 010407          ISZ SQTEM
17 06624 010406          ISZ SQTEM
18 06625 034405          LDA 3,SQTEM        ;RESULT WILL BE IN AC0.
19 06626 000773          JMP .-5
20 06627 161200 SQ1:     MOVR 3,0
21 06630 002401          JMP @SQ,S3
22
23 06631 000000 SQ,S3: 0
24 06632 000000 SQTEM:  0
```

```
↓0112 MPRTS
01
02                AR4:   SETUP              ;THE CONTENTS OF AC2 IS
03                       LCALL SETUL
04 06633 060202          NIOC MAP
05 06634 006067          JSR @SETUL
06                AR4L:  RANDOM             ;DIVIDED INTO AC0-1.
07                       LCALL FRANG
08 06635 060202          NIOC MAP
09 06636 006071          JSR @FRANG
10 06637 040503          STA 0,0AC0
11 06640 044503          STA 1,0AC1
12 06641 050503          STA 2,0AC2
13 06642 142432          SUBZ# 2,0,SZC      ;THIS RESULT MULTIPLIED
14 06643 000772          JMP AR4L                  ;BY AC2 SHOULD PRODUCE
15                       CALL               ;THE CRIGIONAL NUMBERS.
16                       .DIVU
17 06644 004730          JSR DIVU
18                       CALL
19                       .MPYA
20 06645 004713          JSR MPYA
21 06646 034476          LDA 3,0AC2
22 06647 156414          SUB# 2,3,SZR
23                       ERROR              ;AC2 CHANGED?
24 06650 004402          JSR .+2            ;ERROR
25 06651 000403          JMP .+3            ;NO ERROR
26                       LCALL ERRET
27 06652 060202          NIOC MAP
28 06653 006072          JSR @ERRET
29 06654 034467          LDA 3,0AC1
30 06655 136714          SUBS# 1,3,SZR
31                       ERROR              ;AC1 CHANGED.
32 06656 004402          JSR .+2            ;ERROR
33 06657 000403          JMP .+3            ;NO ERROR
34                       LCALL ERRET
35 06660 060202          NIOC MAP
36 06661 006072          JSR @ERRET
37 06662 034460          LDA 3,0AC0
38 06663 116714          SUBS# 0,3,SZR
39                       ERROR              ;AC0 CHANGED.
40 06664 004402          JSR .+2            ;ERROR
41 06665 000403          JMP .+3            ;NO ERROR
42                       LCALL ERRET
43 06666 060202          NIOC MAP
44 06667 006072          JSR @ERRET
45                       LOOP
46                       LCALL LLOOP
47 06670 060202          NIOC MAP
48 06671 006070          JSR @LLOOP
```

```
10113 MPRTS
01
02                ;AR5:
03                          SETUP           ;USE INC TO FORM
04                          LCALL SETUL
05 06672 060202             NIOC MAP
06 06673 006067             JSR @SETUL
07 06674 152440             SUBO 2,2        ;THE NUMBER 177400
08 06675 151504             INCL 2,2,SZR    ;IN AC1 AND 400 IN AC2.
09 06676 151504             INCL 2,2,SZR
10 06677 151504             INCL 2,2,SZR
11 06700 151504             INCL 2,2,SZR
12 06701 151507             INCL 2,2,SBN    ;THE "SBN/SZR" SHOULD
13 06702 151507             INCL 2,2,SBN    ;NOT CAUSE A SKIP.
14 06703 151507             INCL 2,2,SBN
15 06704 145707             INCS 2,1,SBN
16 06705 151407             INC 2,2,SBN
17 06706 151400             INC 2,2
18 06707 133014             ADD# 1,2,SZR
19                          ERROR
20 06710 004402             JSR .+2         ;ERROR
21 06711 000403             JMP .+3         ;NO ERROR
22                          LCALL ERRET
23 06712 060202             NIOC MAP
24 06713 006072             JSR @ERRET
25                          LOOP
26                          LCALL LLOOP
27 06714 060202             NIOC MAP
28 06715 006070             JSR @LLOOP
```

```
10114 MPRTS
01
02                ;AR6:
03                          SETUP           ;USE THE INCR INSTRUCTION
04                          LCALL SETUL
05 06716 060202             NIOC MAP
06 06717 006067             JSR @SETLL
07 06720 126420             SUBZ 1,1        ;TO FORM THE NUMBER
08 06721 125606             INCR 1,1,SEZ    ;177400. THIS NUMBER
09 06722 125606             INCR 1,1,SEZ    ;COMPLIMENTED AND SWAPPED
10 06723 125606             INCR 1,1,SEZ    ;SHOULD BE THE SAME
11 06724 125606             INCR 1,1,SEZ    ;NUMBER.
12 06725 125606             INCR 1,1,SEZ    ;THE "SEZ" SHOULD NEVER
13 06726 125606             INCR 1,1,SEZ    ;CAUSE A SKIP.
14 06727 125606             INCR 1,1,SEZ
15 06730 125606             INCR 1,1,SEZ
16 06731 130304             COMS 1,2,SZR
17 06732 132714             SUBS# 1,2,SZR
18                          ERROR
19 06733 004402             JSR .+2         ;ERROR
20 06734 000403             JMP .+3         ;NO ERROR
21                          LCALL ERRET
22 06735 060202             NIOC MAP
23 06736 006072             JSR @ERRET
24                          LOOP
25                          LCALL LLCOP
26 06737 060202             NIOC MAP
27 06740 006070             JSR @LLOOP
28 06741 000405             JMP .+5
29 06742 000000 OAC0: 0
30 06743 000000 OAC1: 0
31 06744 000000 OAC2: 0
32 06745 000613 MPYAL:  JMP MPYA
```

```
10115 MPRTS
01
02                ;AR7:
03                        SETUP           ;100000 NEGATED IS
04                        LCALL SETUL
05 06746 060202           NIOC MAP
06 06747 006067           JSR @SETLL
07 06750 102625           SUBZR 0,0,SNR   ;STILL 100000.
08                        ERROR
09 06751 004402           JSR .+2         ;ERROR
10 06752 000403           JMP .+3         ;NO ERROR
11                        LCALL ERRET
12 06753 060202           NIOC MAP
13 06754 006072           JSR @ERRET
14 06755 104406           NEG 0,1,SEZ     ;C(CARRY)=0
15                        ERROR
16 06756 004402           JSR .+2         ;ERROR
17 06757 000403           JMP .+3         ;NO ERROR
18                        LCALL ERRET
19 06760 060202           NIOC MAP
20 06761 006072           JSR @ERRET
21 06762 124402           NEG 1,1,SZC
22                        ERROR
23 06763 004402           JSR .+2         ;ERROR
24 06764 000403           JMP .+3         ;NO ERROR
25                        LCALL ERRET
26 06765 060202           NIOC MAP
27 06766 006072           JSR @ERRET
28 06767 124463           NEGC 1,1,SNC    ;C(CARRY)=1
29                        ERROR
30 06770 004402           JSR .+2         ;ERROR
31 06771 000403           JMP .+3         ;NO ERROR
32                        LCALL ERRET
33 06772 060202           NIOC MAP
34 06773 006072           JSR @ERRET
35 06774 124407           NEG 1,1,SBN
36                        ERROR
37 06775 004402           JSR .+2         ;ERROR
38 06776 000403           JMP .+3         ;NO ERROR
39                        LCALL ERRET
40 06777 060202           NIOC MAP
41 07000 006072           JSR @ERRET
42 07001 124465           NEGC 1,1,SNR    ;C(1)=100000
43                        ERROR
44 07002 004402           JSR .+2         ;ERROR
45 07003 000403           JMP .+3         ;NO ERROR
46                        LCALL ERRET
47 07004 060202           NIOC MAP
48 07005 006072           JSR @ERRET
49 07006 124465           NEGC 1,1,SNR
50                        ERROR
51 07007 004402           JSR .+2         ;ERROR
52 07010 000403           JMP .+3         ;NO ERROR
53                        LCALL ERRET
54 07011 060202           NIOC MAP
55 07012 006072           JSR @ERRET
56 07013 124407           NEG 1,1,SBN
57                        ERROR
58 07014 004402           JSR .+2         ;ERROR
59 07015 000403           JMP .+3         ;NO ERROR
60                        LCALL ERRET
```

```
 0116 MPRTS
01 07016 060202           NIOC MAP
02 07017 006072           JSR @ERRET
03 07020 124407           NEG 1,1,SBN
04                        ERROR
05 07021 004402           JSR .+2         ;ERROR
06 07022 000403           JMP .+3         ;NO ERROR
07                        LCALL ERRET
08 07023 060202           NIOC MAP
09 07024 006072           JSR @ERRET
10 07025 106414           SUB# 0,1,SZR
11                        ERROR
12 07026 004402           JSR .+2         ;ERROR
13 07027 000403           JMP .+3         ;NO ERROR
14                        LCALL ERRET
15 07030 060202           NIOC MAP
16 07031 006072           JSR @ERRET
17                        LOOP
18                        LCALL LLOOP
19 07032 060202           NIOC MAP
20 07033 006070           JSR @LLOOP
21
```

```
10117 MPRTS
01                      ;AR8:
02                              SETUP           ;NEGATION OF ZERO
03                              LCALL SETUL
04 07034 060202                 NIOC MAP
05 07035 006067                 JSR @SETUL
06 07036 102440                 SUBO 0,0        ;SHOULD PRODUCE ZERO
07 07037 100762                 NEGCS 0,0,SZC   ;AND A CARRY,
08                              ERROR
09 07040 004402                 JSR .+2         ;ERROR
10 07041 000403                 JMP .+3         ;NO ERROR
11                              LCALL ERRET
12 07042 060202                 NIOC MAP
13 07043 006072                 JSR @ERRET
14 07044 100762                 NEGCS 0,0,SZC
15                              ERROR
16 07045 004402                 JSR .+2         ;ERROR
17 07046 000403                 JMP .+3         ;NO ERROR
18                              LCALL ERRET
19 07047 060202                 NIOC MAP
20 07050 006072                 JSR @ERRET
21 07051 100706                 NEGS 0,0,SEZ
22                              ERROR
23 07052 004402                 JSR .+2         ;ERROR
24 07053 000403                 JMP .+3         ;NO ERROR
25                              LCALL ERRET
26 07054 060202                 NIOC MAP
27 07055 006072                 JSR @ERRET
28 07056 100706                 NEGS 0,0,SEZ
29                              ERROR
30 07057 004402                 JSR .+2         ;ERROR
31 07060 000403                 JMP .+3         ;NO ERROR
32                              LCALL ERRET
33 07061 060202                 NIOC MAP
34 07062 006072                 JSR @ERRET
35 07063 100544                 NEGOL 0,0,SZR
36                              ERROR
37 07064 004402                 JSR .+2         ;ERROR
38 07065 000403                 JMP .+3         ;NO ERROR
39                              LCALL ERRET
40 07066 060202                 NIOC MAP
41 07067 006072                 JSR @ERRET
42 07070 100403                 NEG 0,0,SNC
43                              ERROR
44 07071 004402                 JSR .+2         ;ERROR
45 07072 000403                 JMP .+3         ;NO ERROR
46                              LCALL ERRET
47 07073 060202                 NIOC MAP
48 07074 006072                 JSR @ERRET
49 07075 100644                 NEGOR 0,0,SZR
50                              ERROR
51 07076 004402                 JSR .+2         ;ERROR
52 07077 000403                 JMP .+3         ;NO ERROR
53                              LCALL ERRET
54 07100 060202                 NIOC MAP
55 07101 006072                 JSR @ERRET
56 07102 104704                 NEGS 0,1,SZR
57                              ERROR
58 07103 004402                 JSR .+2         ;ERROR
59 07104 000403                 JMP .+3         ;NO ERROR
60                              LCALL ERRET
```

```
 0118 MPRTS
01 07105 060202                 NIOC MAP
02 07106 006072                 JSR @ERRET
03 07107 130704                 NEGS 1,2,SZR
04                              ERROR
05 07110 004402                 JSR .+2         ;ERROR
06 07111 000403                 JMP .+3         ;NO ERROR
07                              LCALL ERRET
08 07112 060202                 NIOC MAP
09 07113 006072                 JSR @ERRET
10                              LOOP
11                              LCALL LLOOP
12 07114 060202                 NIOC MAP
13 07115 006070                 JSR @LLOOP
```

```
10119 MPRTS
01
02                ;AR9:
03                        SETUP           ;C(AC1)+0+C(AC0) SHOULD
04                        LCALL SETUL
05 07116 060202           NIOC MAP
06 07117 006067           JSR @SETUL
07                        RANDOM          ;PLACE AC0 IN AC1, SEE
08                        LCALL FRANG
09 07120 060202           NIOC MAP
10 07121 006071           JSR @FRANG
11 07122 040620           STA 0,0AC0
12 07123 152400           SUB 2,2         ;SYSTEM REFFERANCE MANUAL
13                        CALL            ;FOR FURTHER INFORMATION,
14 07124 004621           JSR     MPVAL
15 07125 034615           LDA 3,0AC0
16 07126 166414           SUB# 3,1,SZR
17                        ERROR
18 07127 004402           JSR .+2         ;ERROR
19 07130 000403           JMP .+3         ;NO ERROR
20                        LCALL ERRET
21 07131 060202           NIOC MAP
22 07132 006072           JSR @ERRET
23                        LOOP
24                        LCALL LLOOP
25 07133 060202           NIOC MAP
26 07134 006070           JSR @LLOOP
27
28                ;AR10:
29                        SETUP           ;TEST "COM/INC" SWAPPED,
30                        LCALL SETUL
31 07135 060202           NIOC MAP
32 07136 006067           JSR @SETUL
33 07137 102300           ADCS 0,0
34 07140 105705           INCS 0,1,SNR
35 07141 130304           COMS 1,2,SZR
36 07142 145705           INCS 2,1,SNR
37 07143 124346           COMOS 1,1,SEZ
38 07144 131707           INCS 1,2,SBN
39 07145 150304           COMS 2,2,SZR
40 07146 151704           INCS 2,2,SZR
41                        ERROR
42 07147 004402           JSR .+2         ;ERROR
43 07150 000403           JMP .+3         ;NO ERROR
44                        LCALL ERRET
45 07151 060202           NIOC MAP
46 07152 006072           JSR @ERRET
47                        LOOP
48                        LCALL LLOOP
49 07153 060202           NIOC MAP
50 07154 006070           JSR @LLOOP
```

```
10120 MPRTS
01
02                ;AR11:
03                        SETUP           ;COMPLIMENT AND INCREMENT
04                        LCALL SETUL
05 07155 060202           NIOC MAP
06 07156 006067           JSR @SETLL
07                        RANDOM          ;SHOULD BE THE SAME AS
08                        LCALL FRANG
09 07157 060202           NIOC MAP
10 07160 006071           JSR @FRANG
11 07161 110400           NEG 0,2         ;NEGATE
12 07162 104000           COM 0,1
13 07163 125400           INC 1,1
14 07164 132414           SUB# 1,2,SZR
15                        ERROR
16 07165 004402           JSR .+2         ;ERROR
17 07166 000403           JMP .+3         ;NO ERROR
18                        LCALL ERRET
19 07167 060202           NIOC MAP
20 07170 006072           JSR @ERRET
21                        LOOP
22                        LCALL LLOOP
23 07171 060202           NIOC MAP
24 07172 006070           JSR @LLOOP
25
26                ;AR12:
27                        SETUP           ;TEST COM LEFT AND RIGHT,
28                        LCALL SETUL
29 07173 060202           NIOC MAP
30 07174 006067           JSR @SETUL
31                        RANDOM
32                        LCALL FRANG
33 07175 060202           NIOC MAP
34 07176 006071           JSR @FRANG
35 07177 110100           COML 0,2
36 07200 144260           COMCR 2,1
37 07201 106714           SUBS# 0,1,SZR
38                        ERROR
39 07202 004402           JSR .+2         ;ERROR
40 07203 000403           JMP .+3         ;NO ERROR
41                        LCALL ERRET
42 07204 060202           NIOC MAP
43 07205 006072           JSR @ERRET
44                        LOOP
45                        LCALL LLOOP
46 07206 060202           NIOC MAP
47 07207 006070           JSR @LLOOP
```

```
10121 MPRTS
01
02                ;AR13:
03                        SETUP           ;FORM THE PARITY OF
04                        LCALL SETUL
05 07210 060202           NIOC MAP
06 07211 006067           JSR @SETLL
07 07212 105020           MOVZ 0,1        ;C(ACP) IN DIFFIRENT
08 07213 176000           ADC 3,3         ;ROUTINES. CHECK THAT
09 07214 117000           ADD 0,3         ;THE RESULTS ARE EQUAL.
10 07215 163704           ANDS 3,0,SZR
11 07216 000775           JMP .-3
12 07217 102660           SUBCR 0,0       ;SAVE PARITY IN BIT 0.
13 07220 176620           SUBZR 3,3
14 07221 125102           MOVL 1,1,SZC
15 07222 101400           INC 0,0         ;BIT 15 WILL CONTAIN
16 07223 175224           MOVZR 3,3,SZR   ;THE PARITY.
17 07224 000775           JMP .-3
18 07225 115200           MOVR 0,3        ;CHECK TO SEE IF BITS
19 07226 103012           ADD# 0,0,SZC    ;ARE LIKE.
20                        ERROR
21 07227 004402           JSR .+2         ;ERROR
22 07230 000403           JMP .+3         ;NO ERROR
23                        LCALL ERRET
24 07231 060202           NIOC MAP
25 07232 006072           JSR @ERRET
26                        LOOP
27                        LCALL LLOOP
28 07233 060202           NIOC MAP
29 07234 006070           JSR @LLOOP
30
31                ;AR15:
32                        SETUP           ;MISC TEST OF SUB LEFT
33                        LCALL SETUL
34 07235 060202           NIOC MAP
35 07236 006067           JSR @SETLL
36                        RANDOM          ;AND RIGHT.
37                        LCALL FRANG
38 07237 060202           NIOC MAP
39 07240 006071           JSR @FRANG
40 07241 131000           MOV 1,2
41 07242 106500           SUBL 0,1
42 07243 127600           ANDR 1,1
43 07244 107000           ADD 0,1
44 07245 106500           SUBL 0,1
45 07246 127600           ANDR 1,1
46 07247 107000           ADD 0,1
47 07250 132414           SUB# 1,2,SZR
48                        ERROR
49 07251 004402           JSR .+2         ;ERROR
50 07252 000403           JMP .+3         ;NO ERROR
51                        LCALL ERRET
52 07253 060202           NIOC MAP
53 07254 006072           JSR @ERRET
54                        LOOP
55                        LCALL LLOOP
56 07255 060202           NIOC MAP
57 07256 006070           JSR @LLOOP
```

```
10122 MPRTS
01
02                ;AR16:
03                        SETUP           ;MISC TEST OF AND RIGHT.
04                        LCALL SETUL
05 07257 060202           NIOC MAP
06 07260 006067           JSR @SETLL
07                        RANDOM
08                        LCALL FRANG
09 07261 060202           NIOC MAP
10 07262 006071           JSR @FRANG
11 07263 131040           MOVO 1,2
12 07264 113600           ANDR 0,2
13 07265 107400           AND 0,1
14 07266 151100           MCVL 2,2
15 07267 146414           SUB# 2,1,SZR
16                        ERROR
17 07270 004402           JSR .+2         ;ERROR
18 07271 000403           JMP .+3         ;NO ERROR
19                        LCALL ERRET
20 07272 060202           NIOC MAP
21 07273 006072           JSR @ERRET
22                        LOOP
23                        LCALL LLOOP
24 07274 060202           NIOC MAP
25 07275 006070           JSR @LLOOP
```

```
10123 MPRTS
01
02                ;AR17:
03                        SETUP           ;MISC ADD SWAPPED TEST.
04                        LCALL SETUL
05 07276 060202           NIOC MAP
06 07277 006067           JSR @SETUL
07                        RANDOM
08                        LCALL FRANG
09 07300 060202           NIOC MAP
10 07301 006071           JSR @FRANG
11 07302 131000           MOV 1,2
12 07303 113000           ADD 0,2
13 07304 107300           ADDS 0,1
14 07305 125300           MOVS 1,1
15 07306 132414           SUB# 1,2,SZR
16                        ERROR
17 07307 004402           JSR .+2         ;ERROR
18 07310 000403           JMP .+3         ;NO ERROR
19                        LCALL ERRET
20 07311 060202           NIOC MAP
21 07312 006072           JSR @ERRET
22                        LOOP
23                        LCALL LLOOP
24 07313 060202           NIOC MAP
25 07314 006070           JSR @LLOOP
26
27                ;AR18:
28                        SETUP           ;CHECK ADC LEFT.
29                        LCALL SETUL
30 07315 060202           NIOC MAP
31 07316 006067           JSR @SETUL
32                        RANDOM
33                        LCALL FRANG
34 07317 060202           NIOC MAP
35 07320 006071           JSR @FRANG
36 07321 131000           MOV 1,2
37 07322 112120           ADCZL 0,2
38 07323 100000           COM 0,0
39 07324 107120           ADDZL 0,1
40 07325 132414           SUB# 1,2,SZR
41                        ERROR
42 07326 004402           JSR .+2         ;ERROR
43 07327 000403           JMP .+3         ;NO ERROR
44                        LCALL ERRET
45 07330 060202           NIOC MAP
46 07331 006072           JSR @ERRET
47                        LOOP
48                        LCALL LLOOP
49 07332 060202           NIOC MAP
50 07333 006070           JSR @LLOOP
```

```
10124 MPRTS
01
02                ;AR19:
03                        SETUP           ;TEST ADC RIGHT.
04                        LCALL SETUL
05 07334 060202           NIOC MAP
06 07335 006067           JSR @SETUL
07                        RANDOM
08                        LCALL FRANG
09 07336 060202           NIOC MAP
10 07337 006071           JSR @FRANG
11 07340 131000           MOV 1,2
12 07341 112220           ADCZR 0,2
13 07342 100000           COM 0,0
14 07343 107220           ADDZR 0,1
15 07344 132414           SUB# 1,2,SZR
16                        ERROR
17 07345 004402           JSR .+2         ;ERROR
18 07346 000403           JMP .+3         ;NO ERROR
19                        LCALL ERRET
20 07347 060202           NIOC MAP
21 07350 006072           JSR @ERRET
22                        LOOP
23                        LCALL LLOOP
24 07351 060202           NIOC MAP
25 07352 006070           JSR @LLOOP
26
27                ;AR20:
28                        SETUP           ;TEST SUB RIGHT.
29                        LCALL SETUL
30 07353 060202           NIOC MAP
31 07354 006067           JSR @SETUL
32                        RANDOM
33                        LCALL FRANG
34 07355 060202           NIOC MAP
35 07356 006071           JSR @FRANG
36 07357 131000           MOV 1,2
37 07360 106620           SUBZR 0,1
38 07361 100420           NEGZ 0,0
39 07362 113200           ADDR 0,2
40 07363 132414           SUB# 1,2,SZR
41                        ERROR
42 07364 004402           JSR .+2         ;ERROR
43 07365 000403           JMP .+3         ;NO ERROR
44                        LCALL ERRET
45 07366 060202           NIOC MAP
46 07367 006072           JSR @ERRET
47                        LOOP
48                        LCALL LLOOP
49 07370 060202           NIOC MAP
50 07371 006070           JSR @LLOOP
```

```
10125 MPRTS
01
02
03                ARJSR:  SETUP           ;TEST THAT INDEX WITH
04                        LCALL SETUL
05 07372 060202           NIOC MAP
06 07373 006067           JSR @SETUL
07 07374 004401           JSR .+1         ;SIGN BIT SET DOES
08 07375 171122           MOVZL 3,2,SZC   ;NOT LOAD INTO PC ON JSR.
09                        ERROR
10 07376 004402           JSR .+2         ;ERROR
11 07377 000403           JMP .+3         ;NO ERROR
12                        LCALL ERRET
13 07400 060202           NIOC MAP
14 07401 006072           JSR @ERRET
15 07402 151240           MOVOR 2,2
16 07403 005007           JSR 7,2         ;GO TO NEXT LOCATION
17 07404 004401           JSR .+1
18 07405 165000           MOV 3,1         ;JSR SHOULD NEVER
19 07406 125112           MOVL# 1,1,SZC   ;STORE THE SIGN BIT.
20                        ERROR
21 07407 004402           JSR .+2         ;ERROR
22 07410 000403           JMP .+3         ;NO ERROR
23                        LCALL ERRET
24 07411 060202           NIOC MAP
25 07412 006072           JSR @ERRET
26                        LOOP
27                        LCALL LLOOP
28 07413 060202           NIOC MAP
29 07414 006070           JSR @LLOOP
30
31                AREND:  LCALL RETU2
32 07415 060202           NIOC MAP
33 07416 006073           JSR @RETL2
34 07417 000000 ATEND:  0
```

```
10126 MPRTS
                          .TITL NDDSK
02                ;FIXED HEAD NOVA DISK TEST COMPATABLE WITH
03                ;DIAGNOSTIC LINKER
04                ;DEFINITIONS FILE TO LINKER
05                          NEXTT ND.00
06        007420 LMEML=.
07        000114            .LOC LPG0
08 00114  007421            ND.00
09        000115 LPG0=.
10        007420            .LOC LMEML
11 07420  000000            0       ;INTERRUPT TIMEOUT SWITCH
12 07421  007444 ND.00:     ND.01
13 07422  007474            ND.02
14 07423  000000            0       ;WAIT FOR INTA SWITCH
15 07424  000000            0
16 07425  177777            -1      ;RAN # LIMS ALWS ENTER
17 07426  176000            176000  ;PROTECT MASK
18 07427  007660            ND.XI
19 07430  007660            ND.XI
20                          .TXTE (
21 07431  144706 FIXED HEAD DISK TEST(
22        142730
23        120104
24        142510
25        042101
26        042240
27        051711
28        120113
29        142724
30        152123
31        000000
```

```
10127 MPRTS
01                ;INITIALIZE TEST ENTER ADDRESS
02 07444 102000 ND,01:  ADC 0,0
03 07445 062020         DOB 0,DSK
04 07446 065420         DIB 1,DSK       ;=0 IF NO DSK
05 07447 125004         MOV 1,1,SZR
06 07450 000403         JMP .+3
07 07451 040752         STA 0,ND,00+2   ;SET WAIT PERMANENTLY
08 07452 001400         JMP 0,3
09 07453 064420         DIA 1,DSK       ;FIND OUT IF DSK RDY
10 07454 125220         MOVZR 1,1
11 07455 125220         MOVZR 1,1
12 07456 125222         MOVZR 1,1,SZC   ;SKP IF DSK READY
13 07457 000772         JMP .-6         ;IT'S NOT DON'T RUN
14 07460 100000         COM 0,0
15 07461 062020         DOB 0,DSK       ;CLR REG B
16 07462 020406         LDA 0,NDDSK
17 07463 024406         LDA 1,NDMSK
18 07464 032407         LDA 2,@NDSK1
19 07465 054405         STA 3,ND,S3
20 07466 006064         JSR @EINTS
21 07467 002403         JMP @ND,S3
22 07470 000020 NDDSK:  DSK
23 07471 000177 NDMSK:  177
24 07472 000000 ND,S3:  0
25 07473 007711 NDSK1:  NDSKI
```

```
10128 MPRTS
01
02
03                ;NOVA DISK EXECUTE PORTION OF TEST
04
05 07474 020727 ND,02:  LDA  0,ND,00+2  ;GET 2K OF
06 07475 101004         MOV 0,0,SZR     ;SCRATCH AND
07 07476 002725         JMP @ND,00+2    ;ASSIGN IT TO
08                      LCALL ASCRA     ;DCH IF 2K
09 07477 060202         NIOC MAP
10 07500 006053         JSR @ASCRA
11 07501 000557         JMP ND,XI       ;CANNOT BE
12                      LCALL ESCRA     ;ASSIGNED RELEASE
13 07502 060202         NIOC MAP
14 07503 006054         JSR @ESCRA
15 07504 000554         JMP ND,XI       ;IT ALL AND GET
16                      LCALL ADMAP     ;OUT
17 07505 060202         NIOC MAP
18 07506 006074         JSR @ADMAP
19 07507 000551         JMP ND,XI
20                      LCALL EDMAP
21 07510 060202         NIOC MAP
22 07511 006075         JSR @EDMAP
23 07512 000546         JMP ND,XI
```

```
10129 MPRTS
01                ;SCRATCH AREA AND DATA CHANNEL HAVE BEEN SELECTED
02                ;SELECT TRACK AND SECTOR TO EXERCISE
03                ;AND 2 RANDOM WORDS TO KEY DATA FROM
04                ND.2L: LCALL ARANG
05 07513 060202          NIOC MAP
06 07514 006062          JSR @ARANG
07 07515 105000          MOV 0,1
08 07516 030507          LDA 2,ND1774     ;SELECT SECTOR
09                       LCALL ADIVI      ;AND TRACK
10 07517 060202          NIOC MAP
11 07520 006063          JSR @ADIVI
12 07521 040506          STA 0,NDADR
13                       LCALL FRANG      ;GET 3 RAN #'S
14 07522 060202          NIOC MAP
15 07523 006071          JSR @FRANG
16 07524 034106          LDA 3,SCRLO      ;FOR DATA
17 07525 041400          STA 0,0,3
18 07526 045401          STA 1,1,3
19 07527 024475          LDA 1,NDM1K      ;-1776
20 07530 021400          LDA 0,0,3        ;BUFFER
21 07531 041402          STA 0,2,3
22 07532 175400          INC 3,3
23 07533 125404          INC 1,1,SZR
24 07534 000774          JMP .-4
25 07535 020414          LDA 0,NDWRI
26 07536 040665          STA 0,ND,00+2
27 07537 020110          LDA 0,DCHLO
28 07540 024467          LDA 1,NDADR
29 07541 040467          STA 0,NDCCS      ;START ADRS IN DCH
30 07542 044467          STA 1,NDSCS      ;START SECTOR ADRS
31 07543 030463          LDA 2,NDKM4
32 07544 050466          STA 2,NDCPK
33 07545 062020          DOB 0,DSK
34 07546 065320          DOAP 1,DSK
35                       LCALL RETRN
36 07547 060202          NIOC MAP
37 07550 006061          JSR @RETRN
```

```
10130 MPRTS
01
02
03                ;WRITE INTERRUPT RETURN
04 07551 107552 NDWRI:   @NDWRI+1         ;BIT 0 IS WAITI
05 07552 060420          DIA 0,DSK
06 07553 101232          MOVZR# 0,0,SZC
07 07554 000540          JMP NDWER
08 07555 020453          LDA 0,NDCCS
09 07556 010453          ISZ NDSCS
10 07557 101300          MOVS 0,0
11 07560 101700          INCS 0,0
12 07561 040447          STA 0,NDCCS
13 07562 010450          ISZ NDCPK
14 07563 000414          JMP NDWGO
15 07564 020420          LDA 0,NDRDI
16 07565 040636          STA 0,ND,00+2
17 07566 024440          LDA 1,NDKM4
18 07567 044443          STA 1,NDCPK
19 07570 024437          LDA 1,NDADR      ;GET STRT DISK ADRS
20 07571 044440          STA 1,NDSCS      ;FOR DISK READS
21 07572 020436 NDRGO:   LDA 0,NDCCS      ;DISK READ
22 07573 024436          LDA 1,NDSCS      ;START FIRST
23 07574 062020          DOB 0,DSK        ;CONT NXT 3
24 07575 065120          DCAS 1,DSK
25 07576 001400          JMP 0,3
26 07577 020431 NDWGO:   LDA 0,NDCCS      ;DISK WRITE
27 07600 024431          LDA 1,NDSCS      ;OR REWRITE
28 07601 062020          DOB 0,DSK
29 07602 065320          DOAP 1,DSK
30 07603 001400          JMP 0,3          ;DISMISS INTR
31
32                ;READ INTERRUPT RETURN
33 07604 107605 NDRDI:   @NDRDI+1         ;BIT 0 IS WAITI
34 07605 060420          DIA 0,DSK
35 07606 101232          MOVZR# 0,0,SZC
36 07607 000537          JMP NDRER
37 07610 010421          ISZ NDSCS        ;+1 SECTOR
38 07611 020417          LDA 0,NDCCS
39 07612 101300          MOVS 0,0         ;+256 CORE ADRS
40 07613 101700          INCS 0,0
41 07614 040414          STA 0,NDCCS
42 07615 010415          ISZ NDCPK        ;SKIP IF RD 4
43 07616 000754          JMP NDRGO        ;STRT NEXT RD
44 07617 024417          LDA 1,NDCOM      ;COMPARE DONE
45 07620 044603          STA 1,ND,00+2    ;NON INTERRUPT
46 07621 102400          SUB 0,0
47 07622 061220          DOAC 0,DSK
48 07623 001400          JMP 0,3
```

```
10131 MPRTS
01 07624 176002 NDM1K: -1022.
02 07625 001774 ND1774: 1774
03 07626 177774 NDKM4: -4
04 07627 000000 NDADR: 0
05 07630 000000 NDDCS: 0
06 07631 000000 NDSCS: 0
07 07632 000000 NDOPK: 0
08 07633 000000 NDSTA: 0
09 07634 007423 ND002: ND.00+2
10 07635 000000 NDECA: 0
```

```
10132 MPRTS
01
02
03                      ;4 DISK WRITES/READS COMPLETE COMPARE DATA
04 07636 007637 NDCOM:  .+1
05 07637 034106         LDA 2,SCRLO     ;WRITE BUFFER
06 07640 034107         LDA 3,SCRHI     ;IS ALSO VALIDATED
07 07641 175220         MOVZR 3,3       ;TO MAKE SURE IT
08 07642 175220         MOVZR 3,3       ;DIDN'T CHANGE
09 07643 177140         ADDOL 3,3
10 07644 021000 NDCLP:  LDA 0,0,2
11 07645 025002         LDA 1,2,2
12 07646 122414         SUB# 1,0,SZR
13 07647 000425         JMP NDCER
14 07650 151400         INC 2,2
15 07651 156414         SLB# 2,3,SZR    ;SKIP BUFFER COM
16 07652 000772         JMP NDCLP
17                      LCALL ARANG     ;GET RAN #
18 07653 060202         NIOC MAP
19 07654 006062         JSR @ARANG
20 07655 101102         MOVL 0,0,SZC    ;BIT 0 TO CRY
21 07656 103063         ADDC 0,0,SNC    ;SKP IS RELEASE SCRATCH
22 07657 002414         JMP @NDKEEP     ;GET NEW DATA ETC
23                 ND.XI: LCALL RDMAP   ;RELEASE DCH
24 07660 060202         NIOC MAP
25 07661 006076         JSR @RDMAP
26 07662 102401         SUB 0,0,SKP
27 07663 000775         JMP ND.XI
28 07664 042750         STA 0,@ND002    ;CLR SCRATCH ASSIGN
29                 ND.X1: LCALL RSCRA   ;RELEASE SCR
30 07665 060202         NIOC MAP
31 07666 006055         JSR @RSCRA
32 07667 000402         JMP ND.RT
33 07670 000775         JMP ND.X1
34                 ND.RT: LCALL RETRN
35 07671 060202         NIOC MAP
36 07672 006061         JSR @RETRN
```

```
10133 MPRTS
01                ;TYPE COMPARE ERROR INFO
02 07673 007513 NDKEEP: ND.2L
03                NDCER:  LCALL ERROI
04 07674 060202           NIOC MAP
05 07675 006065           JSR @ERROI
06 07676 000401           JMP .+1
07 07677 020462           LDA 0,NDTX1       ;GET TXT ADRS
08                        LCALL ERRTX       ;PRINT HEADER
09 07700 060202           NIOC MAP
10 07701 006060           JSR @ERRTX
11 07702 020725           LDA 0,NDADR
12 07703 025001           LDA 1,1,2
13 07704 031003           LDA 2,3,2
14                        LCALL ERROC
15 07705 060202           NIOC MAP
16 07706 006066           JSR @ERROC
17 07707 000751           JMP ND.XI
18 07710 000750           JMP ND.XI
```

```
10134 MPRTS
01
02
03                ;DISK INTERRUPT DIRECTOR
04
05 07711 007712 NDSKI:   .+1
06 07712 032722           LDA 2,@ND0002
07 07713 001000           JMP 0,2
08                ;DISK STATUS ERROR WRITE
09 07714 040717 NDWER:   STA 0,NDSTA
10 07715 024410           LDA 1,NDSTE
11 07716 046716           STA 1,@ND0002
12 07717 071420           DIB 2,DSK
13 07720 050715           STA 2,NDECA
14 07721 102400           SUB 0,0
15 07722 061220           DOAC 0,DSK
16 07723 040435           STA 0,ND.MO
17 07724 001400           JMP 0,3
18                ;PRINT DISK STATUS ERROR
19
20 07725 007726 NDSTE:   NDSTE+1
21 07726 020705           LDA 0,NDSTA
22 07727 024706           LDA 1,NDECA
23 07730 030430           LDA 2,ND.MO
24                        LCALL ERROI
25 07731 060202           NIOC MAP
26 07732 006065           JSR @ERROI
27 07733 000401           JMP .+1
28 07734 020444           LDA 0,NDTX2       ;TXT ADRS
29                        LCALL ERRTX       ;PRNT HDR
30 07735 060202           NIOC MAP
31 07736 006060           JSR @ERRTX
32 07737 020670           LDA 0,NDADR
33 07740 024670           LDA 1,NDCCS
34 07741 030670           LDA 2,NDSCS
35                        LCALL ERROC
36 07742 060202           NIOC MAP
37 07743 006066           JSR @ERROC
38 07744 000714           JMP ND.XI
39 07745 000713           JMP ND.XI
40
41                ;DISK STATUS ERROR RD
42
43 07746 040665 NDRER:   STA 0,NDSTA
44 07747 024756           LDA 1,NDSTE
45 07750 046664           STA 1,@ND0002
46 07751 071420           DIB 2,DSK
47 07752 050663           STA 2,NDECA
48 07753 102400           SUB 0,0
49 07754 061220           DOAC 0,DSK
50 07755 040403           STA 0,ND.MO
51 07756 010402           ISZ ND.MC
52 07757 001400           JMP 0,3
53 07760 000000 ND.MO:   0
```

```
10135 MPRTS
01 07761 007762 NDTX1: .+1
02 07762 005215          .TXTE (<15><12>NDADR    NEXT WORD IN BUFFER(
03       042116
04       042101
05       004722
06       142516
07       152330
08       153640
09       151317
10       120104
11       047311
12       041240
13       143125
14       142706
15       000322
16 10000 010001 NDTX2: .+1
17 10001 005215          .TXTE (<15><12>STATUS ERR<15><12>
18       152123
19       152101
20       051525
21       142640
22       151322
23       005215
24 10010 042116 NDADR   DSKCA   LAST DADRS(
25       042101
26       004722
27       051504
28       141513
29       004501
30       040714
31       152123
32       042240
33       042101
34       051722
35       000000
```

```
10136 MPRTS
01
02
                                 .TITL MHDSK
04              ;MOVABLE HEAD DISK TEST COMPATABLE WITH
05              ;THE DIAGNOSTIC LINKER
06
07       000033 MHDSK=33
08              ;DEFINITIONS BLOCK TO LINKER
09                      NEXTT MH.00
10       010024 LMEML=.
11       000115         .LOC LPG0
12 00115 010025         MH.00
13       000116 LPG0=.
14       010024         .LOC LMEML
15 10024 000000         0       ;INTERRUPT TIMEOUT SWITCH
16 10025 010051 MH.00:          MH.01
17 10026 010117                 MH.02
18 10027 000000                 0
19 10030 000000                 0
20 10031 177777                 -1
21 10032 176000                 176000
22 10033 010541                 MH.XI
23 10034 010541                 MH.XI
24                              .TXTE (
25 10035 147515 MOVING HEAD DISK SIDE A(
26       144526
27       043516
28       044240
29       040705
30       120104
31       144504
32       045523
33       051640
34       042311
35       120305
35       000101
37
```

```
10137 MPRTS
01                ;DETERMINE IF SYSTEM HAS A MOVING HEAD DISK
02                ;DISABLE TEST ENTER IF NONE EXISTS
03 10051 102000 MH.01:  ADC 0,0
04 10052 004433         DIA 1,MHDSK       ;=100 IF DRV 0 RDY
05 10053 030443         LDA 2,MHTXB
06 10054 125004         MOV 1,1,SZR
07 10055 000405         JMP .+5           ;DISK IS ON PRIMARY SIDE
08 10056 000333         NIOP MHDSK        ;"P" IN CASE ON SECONDARY
09 10057 030436         LDA 2,MHTXA
10 10060 004433         DIA 1,MHDSK
11 10061 125004         MOV 1,1,SZR       ;SKP IS NO DISK
12 10062 000403         JMP .+3
13 10063 040744         STA 0,MH.00+2     ;SET PERMANENT WAIT
14 10064 001400         JMP 0,3
15 10065 125202         MOVR 1,1,SZC      ;ADAPTER OFF 15=1
16 10066 000775         JMP .-3 ;DON' RUN DISK
17 10067 050761         STA 2,MH.01-1     ;SIDE(ADAPTER) TO TYPEOUT
18 10070 102400         SUB 0,0
19 10071 040736         STA 0,MH.00+2
20 10072 024415         LDA 1,MHMK1
21 10073 030421         LDA 2,MHTBA       ;CLR ACTIVE TABLS
22 10074 041000         STA 0,0,2
23 10075 151400         INC 2,2
24 10076 125404         INC 1,1,SZR
25 10077 000775         JMP .-3
26 10100 062033         DOB 0,MHDSK
27 10101 020407         LDA 0,MH.K1       ;DEV #
28 10102 024407         LDA 1,MH.K2       ;INT MSK
29 10103 030407         LDA 2,MH.K3       ;INT SERV DIRECTOR
30 10104 054407         STA 3,MH.S3
31 10105 006064         JSR @EINTS        ;ENT INT SERV PARAMS
32 10106 002405         JMP @MH.S3
33 10107 177764 MHMK1:  -12.
34 10110 000033 MH.K1:  MHDSK
35 10111 000777 MH.K2:  777
36 10112 010430 MH.K3:  MH.IS
37 10113 000000 MH.S3:  0
38 10114 010620 MHTBA:  MHCTB
39 10115 000101 MHTXA:  .TXTE (A(
40 10116 000102 MHTXB:  .TXTE (B(
```

```
10138 MPRTS
01
02
03                ;EXECUTE PORTION OF DISK TEST
04
05 10117 030710 MH.02:  LDA 2,MH.00+2
06 10120 151004         MOV 2,2,SZR
07 10121 001000         JMP 0,2
08                      LCALL ASCRA       ;GET 1K SCR
09 10122 060202         NIOC MAP
10 10123 006053         JSR @ASCRA
11 10124 002455         JMP @MH.XX        ;NONE AVAIL
12                      LCALL ADMAP
13 10125 060202         NIOC MAP
14 10126 006074         JSR @ADMAP
15 10127 002452         JMP @MH.XX
16                      LCALL ARANG
17 10130 060202         NIOC MAP
18 10131 006062         JSR @ARANG
19 10132 105000         MOV 0,1
20 10133 030576         LDA 2,MH.4
21 10134 102400         SUB 0,0
22 10135 040573         STA 0,MH.KK
23                      LCALL ADIVI
24 10136 060202         NIOC MAP
25 10137 006063         JSR @ADIVI
26 10140 100405         NEG 0,0,SNR
27 10141 000412         JMP MH.2C
28              MH.2L:  LCALL ESCRA
29 10142 060202         NIOC MAP
30 10143 006054         JSR @ESCRA
31 10144 000407         JMP MH.2C         ;CANT EXPAND MORE
32                      LCALL EDMAP       ;ASSIGN TO DCH
33 10145 060202         NIOC MAP
34 10146 006075         JSR @EDMAP
35 10147 000426         JMP MH.2R         ;CANT ASSIGN MORE
36 10150 010560         ISZ MH.KK         ;#1K'S +1
37 10151 101404         INC 0,0,SZR
38 10152 000770         JMP MH.2L         ;TRY 1K MORE TO ASSIGN
```

```
10139 MPRTS
01                ;SELECT A RANDOM BUFFER START WITHIN FIRST 256 OF
02                ;THE ASSIGNED SCRATCH AREA
03                MH.2C:  LCALL ARANG
04 10153 060202           NIOC MAP
05 10154 006062           JSR @ARANG
06 10155 105000           MOV 0,1
07 10156 030554           LDA 2,MH256
08                        LCALL ADIVI
09 10157 060202           NIOC MAP
10 10160 006063           JSR @ADIVI
11 10161 024106           LDA 1,SCRLO
12 10162 107000           ADD 0,1
13 10163 044550           STA 1,MHDST     ;DATA START ADDRS
14 10164 024110           LDA 1,DCHLO
15 10165 107000           ADD 0,1
16 10166 044546           STA 1,MHCST     ;CHANNEL START ADDRS
17 10167 024541           LDA 1,MH.KK     ;#1KS
18 10170 127120           ADDZL 1,1       ;*4
19 10171 020544           LDA 0,MH.3
20 10172 107000           ADD 0,1         ;+2 AVAILABLE IN FIRST 1K
21 10173 044543           STA 1,MH.BK     ;# BLOKS/SECTORS AVAIL
22 10174 000456           JMP MH.03       ;FIGURE OU WHAT TO DO
23                MH.2R:  LCALL RSCRA     ;RELEASE 1K SCR
24 10175 060202           NIOC MAP
25 10176 006055           JSR @RSCRA
26 10177 063077           HALT            ;NOT PROBABLE HALT
27 10200 000753           JMP MH.2C
28 10201 010541 MH.XX:  MH.XI
```

```
10140 MPRTS
01
02
03                ;NOW SELECT SECTOR TO EXERCISE
04                MH.3S:  LCALL ARANG
05 10202 060202           NIOC MAP
06 10203 006062           JSR @ARANG
07 10204 105000           MOV 0,1
08 10205 030540           LDA 2,MH24      ;24 SECTORS
09 10206 020530           LDA 0,MH.BK
10 10207 112400           SUB 0,2         ;-# TO WRITE
11                        LCALL ADIVI     ;(0) WILL=SECTOR START
12 10210 060202           NIOC MAP
13 10211 006063           JSR @ADIVI
14 10212 024524           LDA 1,MH.BK
15 10213 125300           MOVS 1,1
16 10214 123000           ADD 1,0         ;CREATE SEC CONTROL WD
17 10215 040523           STA 0,MHSEC     ;START SECTOR AND #
18 10216 124400           NEG 1,1
19 10217 125400           INC 1,1
20 10220 125400           INC 1,1
21 10221 044525           STA 1,MH.WK     ;# TIMES TO REGEN 2 WDS
22                        LCALL FRANG
23 10222 060202           NIOC MAP
24 10223 006071           JSR @FRANG
25 10224 044515           STA 1,MHDW1     ;NEW RAN DATA WDS
26 10225 050515           STA 2,MHDW2
27 10226 034515           LDA 3,MHIDX
28 10227 045402           STA 1,2,3       ;SAVE CONTROL
29 10230 051403           STA 2,3,3       ;WORDS NEWLY
30 10231 020506           LDA 0,MHCYL     ;GENERATED FOR
31 10232 041400           STA 0,0,3       ;THIS OP TABLE
32 10233 020505           LDA 0,MHSEC
33 10234 041401           STA 0,1,3
34                ;GENERATE DATA PATTERN INTO SCRATCH AREA
35
36 10235 030476 MH.3G:  LDA 2,MHDST
37 10236 020503           LDA 0,MHDW1     ;GET 2 DATA WORDS
38 10237 024503           LDA 1,MHDW2     ;TO FIRST 2 WORDS
39 10240 041000           STA 0,0,2       ;IN THE BUFFER
40 10241 045001           STA 1,1,2
41 10242 024504           LDA 1,MH.WK     ;GET # WORDS-2
42 10243 021000           LDA 0,0,2
43 10244 041002           STA 0,2,2
44 10245 151400           INC 2,2
45 10246 125404           INC 1,1,SZR
46 10247 000774           JMP .-4
47 10250 024477           LDA 1,MH.WC     ;WRITE COMMAND
48 10251 000504           JMP MH.05       ;START SEEK AND WRITE
```

```
10141 MPRTS
01
02
03                ;DATA CHANNEL AND SCRATCH ARE ASSIGNED
04                ;SELECT ONE OF THE THREE OP TABLES
05                ;AND PERFORM THE NEXT OPERATION REQ
06
07                MH.03:  LCALL ARANG
08 10252 060202           NIOC MAP
09 10253 006062           JSR @ARANG
10 10254 126400           SUB 1,1
11 10255 103100           ADDL 0,0
12 10256 125100           MOVL 1,1
13 10257 103100           ADDL 0,0
14 10260 125004           MOV 1,1,SZR
15 10261 125020           MOVZ 1,1
16 10262 125100           MOVL 1,1
17 10263 127120           ADDZL 1,1
18 10264 030443           LDA 2,MHTBL
19 10265 133000           ADD 1,2
20 10266 025000           LDA 1,0,2
21 10267 044450           STA 1,MHCYL       ;GET CURRENT CYLINDER
22 10270 021001           LDA 0,1,2
23 10271 040447           STA 0,MHSEC       ;SECTOR AND # SECTORS
24 10272 021002           LDA 0,2,2
25 10273 040446           STA 0,MHDW1       ;DATA WORD 1
26 10274 021003           LDA 0,3,2
27 10275 040445           STA 0,MHDW2       ;DATA WORD 2
28 10276 050445           STA 2,MHIDX       ;SAVE ADDRS CONTOL WORD
29 10277 125004           MOV 1,1,SZR       ;SKIP NO CYL SEL
30 10300 000454           JMP MH.04         ;CYL ENABLE READ IT
31                MH.3L:  LCALL ARANG       ;RANDOM SEL CYL
32 10301 060202           NIOC MAP
33 10302 006062           JSR @ARANG
34 10303 105000           MOV 0,1
35 10304 030440           LDA 2,MH203       ;CYLINDER SELECTED
36                        LCALL ADIVI       ;MUST NOT BE
37 10305 060202           NIOC MAP
38 10306 006063           JSR @ADIVI
39 10307 034420           LDA 3,MHTBL       ;ALREADY IN USE
40 10310 031400           LDA 2,0,3         ;AND CYL 0
41 10311 142415           SUB # 2,0,SNR     ;IS NOT EXERCISED
42 10312 000767           JMP MH.3L
43 10313 031404           LDA 2,4,3
44 10314 142415           SUB# 2,0,SNR
45 10315 000764           JMP MH.3L
46 10316 031410           LDA 2,10,3
47 10317 142415           SUB# 2,0,SNR
48 10320 000761           JMP MH.3L
49 10321 040416           STA 0,MHCYL       ;CYL SEL OK TO USE
50 10322 000660           JMP MH.3S
```

```
10142 MPRTS
01
02
03 10323 000037 MH37:  37
04 10324 000014 MH12:  12.
05 10325 000020 MH20:  20
06 10326 000017 MH17:  17
07 10327 012620 MHTBL:  MHCTR
08 10330 000000 MH.KK:  0
09 10331 000004 MH.4:   4
10 10332 000400 MH256:  256.
11 10333 000000 MHDST:  0
12 10334 000000 MHCST:  0
13 10335 000003 MH.3:   3
14 10336 000000 MH.8K:  0
15 10337 000000 MHCYL:  0
16 10340 000000 MHSEC:  0
17 10341 000000 MHDW1:  0
18 10342 000000 MHDW2:  0
19 10343 000000 MHIDX:  0
20 10344 000313 MH203:  203.
21 10345 000030 MH24:   24.
22 10346 000000 MH.WK:  0
23 10347 000400 MH.WC:  400
24 10350 001000 MH.SC:  1000
25 10351 000000 MH.CO:  0                 ;COMMAND + CYL #
26 10352 000000 MH.OC:  0                 ;SECT SIDE-SECK
27 10353 000000 MHSTA:  0                 ;STATUS READ
```

```
10143 MPRTS
01
02
03                ;AC1=READ OR WRITE COMMAND
04                ;CALCULATE DISK CONTROL WORDS AND
05                ;START SEEK MH.04 IS READ ENTER
06
07 10354 126400 MH.04:  SUB 1,1          ;AC1=READ
08 10355 020762 MH.05:  LDA 0,MHCYL
09 10356 107000         ADD 0,1
10 10357 044772         STA 1,MH.CO      ;READ OR WRITE
11 10360 024760         LDA 1,MHSEC
12 10361 020742         LDA 0,MH37
13 10362 123400         AND 1,0
14 10363 106700         SUBS 0,1
15 10364 030740         LDA 2,MH12
16 10365 142433         SUBZ# 2,0,SNC
17 10366 000404         JMP MH.5S        ;AC0=START SECTOR
18 10367 142400         SUB 2,0
19 10370 030735         LDA 2,MH20
20 10371 143000         ADD 2,0          ;AC0=SECTOR + SIDE 1
21 10372 103120 MH.5S:  ADDZL 0,0        ;SIDE AND
22 10373 103120         ADDZL 0,0        ;SECTOR POSITIONED
23 10374 030742         LDA 2,MH.BK      ;(2)=# 256 WD BLK AVAIL
24 10375 146432         SUBZ# 2,1,SZC
25 10376 145000         MOV 2,1          ;AC1=# SECTORS
26 10377 131300         MOVS 1,2         ;TO EXERCISE
27 10400 124400         NEG 1,1
28 10401 034725         LDA 3,MH17
29 10402 167400         AND 3,1
30 10403 123000         ADD 1,0
31 10404 040746         STA 0,MH.OC      ;=SECTOR SIDE SECT K
32 10405 150400         NEG 2,2
33 10406 151400         INC 2,2
34 10407 151400         INC 2,2          ;GEN # COMPARES
35 10410 050736         STA 2,MH.WK      ;BUFFER L - 2 WORDS
36 10411 102400 MH.5G:  SUB 0,0
37 10412 063233         DOCC 0,MHDSK
38 10413 020421         LDA 0,MHSKI
39 10414 042407         STA 0,@MH.0X
40 10415 024722         LDA 1,MHCYL
41 10416 020732         LDA 0,MH.SC
42 10417 107000         ADD 0,1
43 10420 065333         DOAP 1,MHDSK
44                      LCALL RETRN      ;START SEEK EXIT
45 10421 060202         NIOC MAP
46 10422 006061         JSR @RETRN
47 10423 010027 MH.0X:  MH.00+2
48 10424 000000 MHWD1:  0
49 10425 000000 MHWD2:  0
50 10426 177764 MHM12:  -12.
```

```
10144 MPRTS
01
02
03                ;INTERRUPT SERVICE DISPATCHER
04 10427 010027         MH.00+2
05 10430 060433 MH.IS:  DIA 0,MHDSK
06 10431 040722         STA 0,MHSTA
07 10432 032775         LDA 2,@MH.IS-1
08 10433 001000         JMP 0,2
09
10                ;PROCESS SEEK INTERRUPT
11 10434 110435 MHSKI:  .+1
12 10435 103133         ADDZL# 0,0,SNC
13 10436 000416         JMP MHRSK        ;ERROR RESEEK
14 10437 061033         DOA 0,MHDSK
15 10440 024420         LDA 1,MHRWI      ;READ/WRITE ADRS
16 10441 046766         STA 1,@MH.IS-1
17 10442 102120         ADDZL 0,0
18 10443 040434         STA 0,MH.CO
19 10444 020705 MHRDO:  LDA 0,MH.CO      ;COM# CYL#
20 10445 024705         LDA 1,MH.OC      ;SECTOR SIDE SECK
21 10446 030666         LDA 2,MHCST      ;CHANNEL ADRS
22 10447 072033         DOB 2,MHDSK
23 10450 067033         DOC 1,MHDSK
24 10451 061133         DOAS 0,MHDSK
25 10452 001400         JMP 0,3
26 10453 010411         MH.5G
27 10454 061033 MHRSK:  DOA 0,MHDSK
28 10455 024776         LDA 1,MHRSK-1
29 10456 046751         STA 1,@MH.IS-1
30 10457 001400         JMP 0,3
31
32                ;PROCESS READ OR WRITE INTR
33
34 10460 110461 MHRWI:  .+1
35 10461 105223         MOVZR 0,1,SNC    ;SKP DSK STATUS ERROR
36 10462 000411         JMP MHFOK
37 10463 125222         MOVZR 1,1,SZC    ;SKIP IF NOT DATA LATE
38 10464 000403         JMP .+3          ;DATA LATE ALWAYS TYPE
39 10465 010412         ISZ MH.CO        ;SKP 2ND ERROR FORCE TYPEOUT
40 10466 000756         JMP MHRDO
41 10467 024515         LDA 1,MHSTE
42 10470 046737         STA 1,@MH.IS-1
43 10471 061033         DOA 0,MHDSK
44 10472 001400         JMP 0,3
45 10473 061033 MHFOK:  DOA 0,MHDSK
46 10474 024404         LDA 1,MHCOM
47 10475 046732         STA 1,@MH.IS-1
48 10476 001400         JMP 0,3
49 10477 000000 MH.CO:  0
```

```
10145 MPRTS
01
02
03                ;READ OR WRITE OK NO STAT ERRS
04                ;COMPARE DATA IN BUFFER
05                ;AGAINST WHAT'S SUPPOSED TO BE THERE
06 10500 010501 MHCOM:  .+1
07 10501 176400         SUB 3,3
08 10502 030631         LDA 2,MHDST       ;START ADRS
09 10503 020636         LDA 0,MHDW1
10 10504 025000         LDA 1,0,2         ;COMPARE
11 10505 122414         SUB# 1,0,SZR      ;FIRST 2 WORDS
12 10506 000447         JMP MHERR         ;AGAINST EVERY
13 10507 175400         INC 3,3           ;OTHER IN BUFFER
14 10510 020632         LDA 0,MHDW2
15 10511 025001         LDA 1,1,2
16 10512 122414         SUB# 1,0,SZR
17 10513 000442         JMP MHERR
18 10514 034632         LDA 3,MH.WK       ;#WORDS - 2
19 10515 021000         LDA 0,0,2
20 10516 025002         LDA 1,2,2
21 10517 122414         SUB# 1,0,SZR
22 10520 000435         JMP MHERR
23 10521 055000         STA 3,0,2         ;CLR BUFFER NXT RD
24 10522 151400         INC 2,2           ;BUMP ADRS
25 10523 175404         INC 3,3,SZR       ;SKP DONEALL
26 10524 000771         JMP .-7
27                      LCALL ARANG       ;BITS 1 AND 15=1
28 10525 060202         NIOC MAP
29 10526 006062         JSR @ARANG
30 10527 101232         MOVZR# 0,0,SZC    ;RELEASE THIS
31 10530 103123         ADDZL 0,0,SNC     ;OP TABLE
32 10531 000403         JMP .+3           ;EITHER = 0 KEEP IT
33 10532 102400         SUB 0,0
34 10533 042610         STA 0,@MHIDX
35                      LCALL ARANG
36 10534 060202         NIOC MAP
37 10535 006062         JSR @ARANG
38 10536 101102         MOVL 0,0,SZC      ;NEXT 2 BITS =1?
39 10537 101103         MOVL 0,0,SNC      ;IS RELEASE THIS BUFFER
40 10540 002414         JMP @MH.SX        ;SELECT NEW STRT BUFFER
41                MH.X1:  LCALL RDMAP
42 10541 060202         NIOC MAP
43 10542 006076         JSR @RDMAP
44 10543 101001         MOV 0,0,SKP
45 10544 000775         JMP MH.X1
46                MH.X2:  LCALL RSCRA
47 10545 060202         NIOC MAP
48 10546 006055         JSR @RSCRA
49 10547 102401         SUB 0,0,SKP
50 10550 000775         JMP MH.X2
51 10551 042656         STA 0,@MH.IS-1
52                      LCALL RETRN
53 10552 060202         NIOC MAP
54 10553 006061         JSR @RETRN
55 10554 010153 MH.SX:  MH.2C
```

```
10146 MPRTS
01
02
03                ;ERROR IN DATA COMPARE
04
05 10555 054435 MHERR:  STA 3,MH.SA
06                      LCALL ERROI
07 10556 060202         NIOC MAP
08 10557 006065         JSR @ERRCI
09 10560 000401         JMP .+1
10 10561 020453         LDA 0,MHTX1
11                      LCALL ERRTX
12 10562 060202         NIOC MAP
13 10563 006060         JSR @ERRTX
14 10564 020426         LDA 0,MH.SA
15 10565 026430         LDA 1,@MHDSX
16 10566 032430         LDA 2,@MHCSX
17                      LCALL ERROC
18 10567 060202         NIOC MAP
19 10570 006066         JSR @ERRCC
20 10571 000401         JMP .+1
21 10572 020455         LDA 0,MHTX2
22                      LCALL ERRTX
23 10573 060202         NIOC MAP
24 10574 006060         JSR @ERRTX
25 10575 022422         LDA 0,@MHSTX
26 10576 026415         LDA 1,@MH.CX
27 10577 032415         LDA 2,@MH.OX
28                      LCALL ERROC
29 10600 060202         NIOC MAP
30 10601 006066         JSR @ERRCC
31 10602 000732         JMP MH.XI-5       ;RELEASE IMMED SW0=1
32 10603 000736         JMP MH.XI
33
34                ;NON REC DISK STATUS ERROR
35
36 10604 010605 MHSTE:  .+1
37 10605 061433         DIB 0,MHCSK
38 10606 006433         DIC 1,MHCSK
39 10607 032410         LDA 2,@MHSTX
40 10610 036407         LDA 3,@MHSTX
41 10611 000744         JMP MHERR
42
43 10612 000000 MH.SA:  0
44 10613 010351 MH.CX:  MH.CO
45 10614 010352 MH.OX:  MH.OC
46 10615 010333 MHDSX:  MHDST
47 10616 010334 MHCSX:  MHCST
48 10617 010353 MHSTX:  MHSTA
```

```
10147 MPRTS
01                      ;3/4 WORD OPERATION TABLES
02 10620 000014 MHCTB:  .BLK 12.
03
04 10634 010635 MHTX1:  .+1
05 10635 005215         .TXTE (<15><12>MH.SA    MHDST   MHCST(
06       044115
07       051456
08       004501
09       044115
10       051504
11       004724
12       044115
13       051703
14       000324
15 10647 010650 MHTX2:  .+1
16 10650 005215         .TXTE (<15><12>MHSTA    MH.CO   MH.OC(
17       044115
18       152123
19       004501
20       044115
21       141456
22       004717
23       044115
24       147456
25       000303
```

```
10148 MPRTS
                        .TITL FPTST
02                      ;FLT POINT UNIT TEST TO RUN WITH
03                      ;THE DIAGNOSTIC LINKER
04                      ;DEFINE FLT PT INSTRUCTIONS
05       000076         .DUSR FPU=76
06       000075         .DUSR FPU2=FPU-1
07       000074         .DUSR FPU1=FPU-2
08       060375                 .DUSR FMFT=NICP FPU2
09       060275                 .DUSR FMTF=NICC FPU2
10       062374                 .DIAC FLCDS=DOBP 0,FPU1
11       062375                 .DIAC FLCDD=DOBP 0,FPU2
12       062174                 .DIAC FSTRS=DOBS 0,FPU1
13       062175                 .DIAC FSTRD=DOBS 0,FPU2
14       060676                 .DIAC FPRST=DIAC 0,FPU
15       061076                 .DIAC FPLST=DOA 0,FPU
```

```
10149 MPRTS
01                ;TEST INTERFACE TO LINKER
02                      NEXTT F,000
03        010662 LMEML=.
04        000116        .LOC LPG0
05 00116 010663         F,000
06        000117 LPG0=.
07        010662        .LOC LMEML
08 10662 000000         0       ;INTERRUPT TIMEOUT SWITCH
09 10663 010702 F,000:  FP,01
10 10664 010716         FP,02
11 10665 000000         0
12 10666 000000         0
13 10667 177777         -1
14 10670 176000         176000
15 10671 011144         FP,EC
16 10672 011144         FP,EC
17                      .TXTE (
18 10673 146306 FLT POINT TST(
19        120324
20        147520
21        047311
22        120324
23        051724
24        000324
25                ;TEST INITIALIZE ROUTINE
26                ;DETERMINE IF FPL EXISTS
27                ;ENABLE OR DISABLE TEST ACCORDINGLY
28 10702 102000 FP,01:  ADC 0,0
29 10703 040762         STA 0,F,000+2   ;DISABLE TEST ENTER
30 10704 104400         NEG 0,1
31 10705 065076         FPLST 1         ;SETS DIAG MODE
32 10706 064676         FPRST 1         ;READ STATUS BACK
33 10707 124405         NEG 1,1,SNR     ;SKP IF FPU
34 10710 001400         JMP 0,3         ;EXIT TEST DISABLED
35 10711 040467         STA 0,FP,TK     ;SET NO SCRA SW
36 10712 102400         SUB 0,0
37 10713 040752         STA 0,F,000+2
38 10714 061076         FPLST 0
39 10715 001400         JMP 0,3
```

```
10150 MPRTS
01                ;
02                ;EXECUTE ENTRY POINT
03 10716 010462 FP,02:  ISZ FP,TK       ;SKP IS NO SCRATCH
04 10717 002467         JMP FP,03       ;DO NXT IN SEQ
05 10720 102400         SUB 0,0
06 10721 040464         STA 0,FP,KK     ;0 # EXTRA 1K'S
07                      LCALL ASCRA     ;TRY TO GET 1K
08 10722 002202         NIOC MAP
09 10723 006053         JSR @ASCRA
10 10724 000574         JMP FP,05       ;NONE AVAILABLE
11 10725 102000         ADC 0,0         ;-1 TO
12 10726 040454         STA 0,FP,ES     ;NO ERRS%
13                      LCALL ARANG     ;GET RAM#
14 10727 002202         NIOC MAP
15 10730 006062         JSR @ARANG
16 10731 030450         LDA 2,FP,37
17 10732 105000         MOV 0,1
18                      LCALL ADIVI     ;REM##1K'S TO EXPAND
19 10733 002202         NIOC MAP
20 10734 006063         JSR @ADIVI
21 10735 100405         NEG 0,0,SNR
22 10736 000407         JMP FP,2A
23                FP,2L:  LCALL ESCRA   ;EXPAND SCRATCH 1K
24 10737 002202         NIOC MAP
25 10740 006054         JSR @ESCRA
26 10741 000404         JMP FP,2A       ;NO MORE AVAILABLE
27 10742 012443         ISZ FP,KK       ;+1 # EXTRA 1K'S
28 10743 101404         INC 0,0,SZR
29 10744 000773         JMP FP,2L       ;KEEP EXPANDING
```

```
10151 MPRTS
01
02                ;SCRATCH AREA HAS BEEN ASSIGNED RANDOMLY SEL
03                ;WHER TO MOVE TEST WITHIN SCRATCH AREA
04                ;SCRLO+1 TO SCRLO+400 DEPENDS ON RELATIONSHIP OF LAST
05                ;RANDOM # TO SCRATCH AREA
06 10745 030434 FP.2A:  LDA 2,FP.37
07 10746 150400         NEG 2,2
08                      LCALL ARANG       ;GET RAN #
09 10747 060202         NIOC MAP
10 10750 006062         JSR @ARANG
11 10751 030433         LDA 2,FP255
12 10752 105000         MOV 0,1
13                      LCALL ADIVI       ;RET WITH AC0=DISPLACEMENT
14 10753 060202         NIOC MAP
15 10754 006063         JSR @ADIVI
16 10755 024106         LDA 1,SCRLO
17 10756 125400         INC 1,1
18 10757 123000         ADD 1,0
19 10760 040550 FP.2C:  STA 0,FP.LC       ;ADRESS TO RELOC TESTS
20 10761 000425         JMP FP.03         ;INIT FIRST TEST
21                ;RELOCATE TEST TO SELECTED SCRATCH AREA
22 10762 144000 FP.RL:  COM 2,1           ;-#WORDS TO MOV
23 10763 111000         MOV 0,2           ;TO ADRS
24 10764 034546         LDA 3,FP.BG       ;FROM ADRS
25 10765 020540         LDA 0,FP.HI       ;GET HI REL SCR
26 10766 041000         STA 0,0,2
27 10767 151400         INC 2,2           ;HIGH LIMIT FOR TEST
28 10770 021400 FP.L2:  LDA 0,0,3
29 10771 041000         STA 0,0,2
30 10772 175400         INC 3,3
31 10773 151400         INC 2,2
32 10774 125404         INC 1,1,SZR
33 10775 000773         JMP FP.L2         ;MOV ALL TO SCRTCH
34 10776 050535         STA 2,FP.EN       ;SAVE LAST LOC+1
35 10777 000454         JMP FP.GC
36 11000 000000 FP.TK:  0
37 11001 000037 FP.37:  37
38 11002 000000 FP.ES:  0
39 11003 001777 FK1K:   1777
40 11004 000377 FP255:  255.
41 11005 000000 FP.KK:  0
```

```
10152 MPRTS
01
02
03                ;TESTS  MOVED TO SCRATCH
04                ;FP.03 SELECTS LOGICAL PAGE ASSIGNMENT
05                ;MOVES NEXT TEST TO SCRATCH VIA FP.RL
06                ;RETURNS TO FP.GC
07                ;AND INITIATES TEST VIA GSCRA
08
09 11006 020774 FP.03:  LDA 0,FP.ES       ;GET ERR SWITCH
10 11007 101005         MOV 0,0,SNR       ;SKIP IS NO ERR
11 11010 000443         JMP FP.GC         ;USE PREV ASSIGN
12                      LCALL ARANG
13 11011 060202         NIOC MAP
14 11012 006062         JSR @ARANG
15 11013 105000         MOV 0,1
16 11014 030512         LDA 2,FP.40
17 11015 034770         LDA 3,FP.KK
18 11016 172400         SUB 3,2           ;DONT EXPAND ABOVE 32K
19                      LCALL ADIVI
20 11017 060202         NIOC MAP
21 11020 006063         JSR @ADIVI
22 11021 040515         STA 0,FP.LP
23 11022 024506         LDA 1,FP.LC
24 11023 030106         LDA 2,SCRLO
25 11024 146400         SUB 2,1
26 11025 111300         MOVS 0,2
27 11026 153120         ADDZL 2,2
28 11027 050505         STA 2,FP.LO
29 11030 034755         LDA 3,FP.KK       ;RECALC SCRHI
30 11031 175300         MOVS 3,3
31 11032 177120         ADDZL 3,3
32 11033 157000         ADD 2,3
33 11034 020747         LDA 0,FK1K
34 11035 117000         ADD 0,3
35 11036 054467         STA 3,FP.HI
36 11037 133220         ADDZR 1,2
37 11040 151500         INCL 2,2
38 11041 050463         STA 2,FP.GA
39 11042 020736         LDA 0,FP.TK
40 11043 034557         LDA 3,FP.TT
41 11044 117000         ADD 0,3
42 11045 031400         LDA 2,0,3
43 11046 050464         STA 2,FP.RG
44 11047 020461         LDA 0,FP.LC
45 11050 031000         LDA 2,0,2
46 11051 054460         STA 3,FP.TP
47 11052 000710         JMP FP.RL
48 11053 020463 FP.GO:  LDA 0,FP.LP       ;REMAP SCR TO HERE
49 11054 030450         LDA 2,FP.GA       ;STARTING LOGICAL ADRS
50 11055 024462         LDA 1,FPERR       ;1=ERROR RET ADDRS
51                      LCALL GSCRA       ;GO TO SCRPCH
52 11056 060202         NIOC MAP
53 11057 006056         JSR @GSCRA
54 11060 000426         JMP FP.GC         ;COULDNT REMAP GO DIRECT
55                ;RETURN TO NEXT LOC PASS COMPLETE NO ERRS
56 11061 010450         ISZ FP.TP
57 11062 022447         LDA 0,@FP.TP      ;GET ADRS NXT TST
58 11063 100004         COM 0,0,SZR       ;=-1 IS END OF SEQ
59 11064 000436         JMP FP.XI
60 11065 020715         LDA 0,FP.ES       ;CHK FOR PREV ERR
```

```
 0153 MPRTS
01 11066 101004          MOV 0,0,SZR      ;SKP ON PREV ERR
02 11067 000403          JMP .+3          ;RELEASE ASSIGN
03 11070 040710          STA 0,FP,TK
04 11071 000431          JMP FP,XI
05                       LCALL ARANG      ;IF BITS 0 AND 1=1
06 11072 060202          NIOC MAP
07 11073 006062          JSR @ARANG
08 11074 103043          ADDO 0,0,SNC     ;RELEASE AND REMAP
09 11075 103003          ADD 0,0,SNC      ;IF EITHER =0 MAKE
10 11076 000405          JMP FP,04                ;NEXT PASS SELECT NEW LP
11                FP,4A: LCALL RSCRA
12 11077 060202          NIOC MAP
13 11100 006055          JSR @RSCRA
14 11101 000417          JMP FP,05        ;SET NO SCRFPCH
15 11102 000775          JMP FP,4A
16 11103 102400 FP,04:   SUB 0,0
17 11104 040674          STA 0,FP,TK
18 11105 000415          JMP FP,XI
19                ;MAP OPTION DOES NOT EXIST GO DIRECT
20                ;AFTER READJUSTING SCRHI PARAMETER
21 11106 020107 FP,GD:   LDA 0,SCRHI
22 11107 040416          STA 0,FP,HI
23 11110 042420          STA 0,@FP,LC
24 11111 034417          LDA 3,FP,LC
25 11112 020106          LDA 0,SCRLO
26 11113 040421          STA 0,FP,LO
27 11114 175400          INC 3,3
28 11115 175400          INC 3,3
29 11116 054406          STA 3,FP,GA
30 11117 001400          JMP 0,3
31                ;SET SCRATCH RELEASED SW AND EXIT
32 11120 102000 FP,05:   ADC 0,0
33 11121 040657          STA 0,FP,TK
34                FP,XI: LCALL RETRN
35 11122 060202          NIOC MAP
36 11123 006061          JSR @RETRN
37 11124 000000 FP,GA:   0
38 11125 000000 FP,HI:   0
39 11126 000040 FP,40:   040
40 11127 000000 FPS03:   0
41 11130 000000 FP,LC:   0
42 11131 000000 FP,TP:   0
43 11132 000000 FP,BG:   0
44 11133 000000 FP,EN:   0
45 11134 000000 FP,LO:   0
46 11135 000000 FP,LA:   0
47 11136 000000 FP,LP:   0
```

```
10154 MPRTS
01
02
03                ;ERROR IN TEST DURING EXECUTION
04
05 11137 011140 FPERR:   FPERR+1
06 11140 054767          STA 3,FPS03      ;PRINT ERR HEADERS
07                       LCALL ERRCI
08 11141 060202          NIOC MAP
09 11142 006065          JSR @ERRCI
10 11143 000401          JMP .+1
11 11144 020464 FP,EC:   LDA 0,F,TX1
12                       LCALL ERRTX
13 11145 060202          NIOC MAP
14 11146 006060          JSR @ERRTX
15 11147 020761          LDA 0,FP,LC      ;FOLLOW UP WITH
16 11150 024764          LDA 1,FP,LO      ;TEST RELOC INFO
17 11151 030762          LDA 2,FP,EN
18                       LCALL ERROC
19 11152 060202          NIOC MAP
20 11153 006066          JSR @ERRCC
21 11154 000401          JMP .+1
22 11155 020466          LDA 0,F,TX2
23                       LCALL ERRTX
24 11156 060202          NIOC MAP
25 11157 006060          JSR @ERRTX
26 11160 020747          LDA 0,FPS03      ;CONTINUE TYPE
27 11161 024755          LDA 1,FP,LP      ;RELOC
28 11162 030620          LDA 2,FP,ES      ;=0 PREV ERR
29                       LCALL ERROC
30 11163 060202          NIOC MAP
31 11164 006066          JSR @ERRCC
32 11165 000401          JMP .+1
33 11166 020470          LDA 0,F,TX3
34                       LCALL ERRTX
35 11167 060202          NIOC MAP
36 11170 006060          JSR @ERRTX
37 11171 020734          LDA 0,FP,HI      ;HI SCRATCH REL.
38 11172 024740          LDA 1,FP,BG      ;TST BEFORE MOVE
39 11173 030731          LDA 2,FP,GA      ;WHERE STARTS REL.
40                       LCALL ERROC
41 11174 060202          NIOC MAP
42 11175 006066          JSR @ERRCC
43 11176 000401          JMP .+1
44 11177 020472          LDA 0,F,TX4
45                       LCALL ERRTX
46 11200 060202          NIOC MAP
47 11201 006060          JSR @ERRTX
48 11202 034731          LDA 3,FP,EN
49 11203 021776          LDA 0,-2,3
50 11204 024730          LDA 1,FP,LO
51 11205 111000          MOV 0,2          ;RECALCULATE ADRS
52 11206 132400          SUB 1,2          ;OF FAILED DATA
53 11207 024106          LDA 1,SCRLO      ;IN RELATION TO
54 11210 133000          ADD 1,2          ;SCRATCH AT 1ST LEVEL
55 11211 101004          MOV 0,0,SZR      ;NOT DATA ERR SKP
56 11212 025000          LDA 1,0,2
57                       LCALL ERROC
58 11213 060202          NIOC MAP
59 11214 006066          JSR @ERRCC
60 11215 000662          JMP FP,4A        ;SW3=1 RELEASE SCR
```

```
 0155 MPMTS
01 11216 102400          SUB 0,0
02 11217 042407          STA 0,@FPESX     ;SET ERR SW
03 11220 042407          STA 0,@FPTKX     ;CLR TEST K
04 11221 000701          JMP FP.XI        ;RETURN TO LINKR
05 11222 011223 FP.TT:   FP.TT+1
06 11223 011305          FLT01
07 11224 011455          FLT02
08 11225 177777          -1
09 11226 011002 FPESX:   FP.ES
10 11227 011000 FPTKX:   FP.TK
```

```
 0156 MPMTS
01 11230 011231 F.TX1:   .+1
02 11231 005215          .TXTE (<15><12>FP.LC    FP.LO   FP.EN(
03        050306
04        146056
05        004773
06        050306
07        146056
08        004717
09        050306
10        142456
11        000116
12 11243 011244 F.TX2:   .+1
13 11244 005215          .TXTE (<15><12>FPS03    FP.LP   FP.ES(
14        050306
15        030123
16        004463
17        050306
18        146056
19        004520
20        050306
21        142456
22        000123
23 11256 011257 F.TX3:   .+1
24 11257 005215          .TXTE (<15><12>FP.HI    FP.BG   FP.GA(
25        050306
26        044056
27        004711
28        050306
29        041056
30        004507
31        050306
32        043456
33        000131
34 11271 011272 F.TX4:   .+1
35 11272 005215          .TXTE (<15><12>L ADRS   DATA    S ADRS(
36        120314
37        042101
38        051722
39        042011
40        152101
41        004501
42        120123
43        042121
44        051722
45        000000
```

```
10157 MPRTS
01
02
03                ;FLOATING POINT  LOAD AND STORE TEST
04                ;SINGLE PRECISION OPERANDS
05
06 11305 000147 FLT01:  FLT1E-FLT01
07 11306 004401         JSR .+1
08 11307 020776         LDA 0,FLT01
09 11310 117000         ADD 0,3
10 11311 054537         STA 3,FLT1A       ;LOAD DATA START
11 11312 024772         LDA 1,FLT01-1     ;GET UPPER LOG ADDRESS
12 11313 166640         SUBOR 3,1         ;HALF SCRATCH 2 WORDS EACH
13 11314 121220         MOVZR 1,0         ;1 FOURTH SCRATCH
14 11315 117000         ADD 0,3
15 11316 054533         STA 3,FLT1B       ;START OF STORE BUFFER
16 11317 040533         STA 0,FLT1C
17 11320 105000         MOV 0,1
18 11321 030527         LDA 2,FLT1A
19 11322 124400         NEG 1,1
20                FLT1L:  LCALL ARANG       ;FILL 1 FOURTH
21 11323 060202         NIOC MAP
22 11324 006062         JSR @ARANG
23 11325 041000         STA 0,0,2         ;OF BUFFER
24 11326 151400         INC 2,2           ;WITH RANDOM #'S
25 11327 125404         INC 1,1,SZR
26 11330 000773         JMP FLT1L
27 11331 020517         LDA 0,FLT1A       ;FILL BUFFER
28 11332 024517         LDA 1,FLT1B       ;1ST PAIR
29 11333 030517         LDA 2,FLT1C       ;MOVE 1ST TO TEMP
30 11334 150640         NEGOR 2,2         ;STORE 2ND PAIR
31 11335 151400         INC 2,2
32 11336 176520         SUBZL 3,3         ;MOVE 1ST PAIR BACK
33 11337 175120         MOVZL 3,3         ;AND STORE THEM
34 11340 062374 FLT1M:  FLODS 0           ;LOAD FIRST 2 RAN #'S
35 11341 163000         ADD 3,0
36 11342 066174         FSTRS 1           ;STORE THEM BACK
37 11343 167000         ADD 3,1
38 11344 060375         FMFT              ;SAVE IN TEMP
39 11345 000401         JMP .+1
40 11346 062374         FLODS 0           ;GET NEXT 2 RAN #'S
41 11347 000401         JMP .+1
42 11350 066174         FSTRS 1
43 11351 167000         ADD 3,1
44 11352 060275         FMTF              ;RESTORE 1ST 2 RAN #'S
45 11353 000401         JMP .+1
46 11354 066174         FSTRS 1           ;STORE THEM AGAIN
47 11355 167000         ADD 3,1
48 11356 151404         INC 2,2,SZR
49 11357 000761         JMP FLT1M
```

```
10158 MPRTS
01
02
03                ;COMPARE SINGLE PREC STORE COMPARE
04
05 11360 030470         LDA 2,FLT1A
06 11361 034470         LDA 3,FLT1B
07 11362 024470         LDA 1,FLT1C
08 11363 124640         NEGOR 1,1
09 11364 125400         INC 1,1
10 11365 044467         STA 1,FLT1E
11 11366 021000 FLT1T:  LDA 0,0,2         ;GET FIRST WORD OF PAIR
12 11367 025400         LDA 1,0,3         ;GET FIRST STORE
13 11370 122414         SUB# 1,0,SZR      ;NOT=IS ERR
14 11371 000446         JMP FLT1D
15 11372 010455         ISZ F1WDS
16 11373 025404         LDA 1,4,3         ;GET 2ND TIME STORED
17 11374 122414         SUB# 1,0,SZR
18 11375 000442         JMP FLT1D
19 11376 014451         DSZ F1WDS
20 11377 063077         HALT
21 11400 151400         INC 2,2
22 11401 175400         INC 3,3
23 11402 021000         LDA 0,0,2         ;GET 2ND WORD OF PAIR
24 11403 025400         LDA 1,0,3         ;FIRST TIME IT STORED
25 11404 122414         SUB# 1,0,SZR
26 11405 000432         JMP FLT1D
27 11406 010441         ISZ F1WDS
28 11407 025404         LDA 1,4,3         ;2ND TIME 2ND WORD
29 11410 122414         SUB# 1,0,SZR
30 11411 000426         JMP FLT1D
31 11412 014435         DSZ F1WDS
32 11413 063077         HALT
33 11414 151400         INC 2,2
34 11415 175400         INC 3,3
35 11416 021000         LDA 0,0,2         ;FIRST WORD 2ND PAIR
36 11417 025400         LDA 1,0,3
37 11420 122414         SUB# 1,0,SZR
38 11421 000416         JMP FLT1D
39 11422 021001         LDA 0,1,2         ;2ND WORD 2ND PAIR
40 11423 025401         LDA 1,1,3
41 11424 106414         SUB# 0,1,SZR
42 11425 000410         JMP FLT1D-2
43 11426 175620         INCZR 3,3         ;+3 TO STORE
44 11427 175500         INCL 3,3          ;BUFFER ADDRESS
45 11430 175400         INC 3,3
46 11431 010423         ISZ FLT1E         ;DONE ALL SKIP
47 11432 000734         JMP FLT1T
48                      LCALL RETU2       ;TEST PASSED RETURN
49 11433 060202         NIOC MAP
50 11434 006073         JSR @RETL2
```

```
10159 MPRTS
01
02                ;ERROR RETURN FROM THIS TEST
03
04 11435 151400           INC 2,2
05 11436 175400           INC 3,3
06 11437 040414 FLT1D:    STA 0,FLT1F
07 11440 020407           LDA 0,F1WDS
08 11441 103120           ADDZL 0,0
09 11442 117000           ADD 0,3
10 11443 020410           LDA 0,FLT1F
11 11444 054407           STA 3,FLT1F       ;SAVE REAL ADRS OF ERR
12                        LCALL ERRET
13 11445 060202           NIOC MAP
14 11446 006072           JSR @ERRET
15
16 11447 000000 F1WDS: 0
17 11450 000000 FLT1A:  0
18 11451 000000 FLT1B:  0
19 11452 000000 FLT1C:  0
20 11453 000000 FLT1F: 0
21 11454 000000 FLT1E:  0
```

```
10160 MPRTS
01
02
03                ;FLOATING POINT  LOAD AND STORE TEST
04                ;DOUBLE PRECISION OPERANDS
05
06 11455 000171 FLT02:  FLT2E-FLT02
07 11456 064401           JSR .+1
08 11457 020776           LDA 0,FLT02
09 11460 117000           ADD 0,3
10 11461 054561           STA 3,FLT2A       ;LOAD DATA START
11 11462 024772           LDA 1,FLT02-1     ;GET UPPER LOG ADDRESS
12 11463 166640           SLBOR 3,1         ;HALF SCRATCH 2 WORDS EACH
13 11464 121220           MOVZR 1,0         ;1 FOURTH SCRATCH
14 11465 117000           ADD 0,3
15 11466 054555           STA 3,FLT2B       ;START OF STORE BUFFER
16 11467 040555           STA 0,FLT2C
17 11470 105000           MOV 0,1
18 11471 030551           LDA 2,FLT2A
19 11472 124400           NEG 1,1
20                FLT2L:  LCALL ARANG       ;FILL 1 FOURTH
21 11473 060202           NIOC MAP
22 11474 006062           JSR @ARANG
23 11475 041000           STA 0,0,2         ;OF BUFFER
24 11476 151400           INC 2,2           ;WITH RANDOM #'S
25 11477 125404           INC 1,1,SZR
26 11500 000773           JMP FLT2L
27 11501 020541           LDA 0,FLT2A       ;FILL BUFFER
28 11502 024541           LDA 1,FLT2B       ;1ST 4
29 11503 030541           LDA 2,FLT2C       ;MOVE 1ST TO TEMP
30 11504 150640           NEGOR 2,2         ;STORE 2ND 4
31 11505 151240           MOVOR 2,2
32 11506 151400           INC 2,2
33 11507 176520           SLBZL 3,3         ;MOVE 1ST 4 BACK
34 11510 177120           ADDZL 3,3         ;AND STORE THEM
35 11511 062375 FLT2M:  FLODD 0           ;LOAD FIRST 4 RAN #'S
36 11512 163000           ADD 3,0
37 11513 066175           FSTRD 1           ;STORE THEM BACK
38 11514 167000           ADD 3,1
39 11515 060375           FMFT              ;SAVE IN TEMP
40 11516 000401           JMP .+1
41 11517 062375           FLODD 0           ;GET NEXT 4 RAN #'S
42 11520 000401           JMP .+1
43 11521 066175           FSTRD 1
44 11522 167000           ADD 3,1
45 11523 060275           FMTF              ;RESTORE 1ST 4 RAN #'S
46 11524 000401           JMP .+1
47 11525 066175           FSTRD 1           ;STORE THEM AGAIN
48 11526 167000           ADD 3,1
49 11527 151404           INC 2,2,SZR
50 11530 000761           JMP FLT2M
```

```
10161 MPRTS
01
02
03                ;COMPARE DOUBLE PREC STORE COMPARE
04
05 11531 030511           LDA 2,FLT2A
06 11532 034511           LDA 3,FLT2B
07 11533 024511           LDA 1,FLT2C
08 11534 124640           NEGOR 1,1
09 11535 125240           MOVOR 1,1
10 11536 125400           INC 1,1
11 11537 044507           STA 1,FLT2E
12 11540 102120 FLT2T:    ADCZL 0,0
13 11541 040477           STA 0,FLT2S
14 11542 021000           LDA 0,0,2       ;GET FIRST WORD OF 4
15 11543 025400           LDA 1,0,3       ;GET FIRST STORE
16 11544 122414           SUB# 1,0,SZR    ;NOT=IS ERR
17 11545 000462           JMP FLT2D
18 11546 010473           ISZ F2WDS
19 11547 025410           LDA 1,10,3      ;GET 2ND TIME STORED
20 11550 122414           SUB# 1,0,SZR
21 11551 000456           JMP FLT2D
22 11552 014467           DSZ F2WDS
23 11553 063077           HALT
24 11554 151400           INC 2,2
25 11555 175400           INC 3,3
26 11556 021000           LDA 0,0,2       ;GET 2ND WORD OF 4
27 11557 025400           LDA 1,0,3       ;FIRST TIME IT STORED
28 11560 122414           SUB# 1,0,SZR
29 11561 000446           JMP FLT2D
30 11562 010457           ISZ F2WDS
31 11563 025410           LDA 1,10,3      ;2ND TIME 2ND WORD
32 11564 122414           SUB# 1,0,SZR
33 11565 000442           JMP FLT2D
34 11566 014453           DSZ F2WDS
35 11567 063077           HALT
36 11570 151400           INC 2,2
37 11571 175400           INC 3,3
38 11572 010446           ISZ FLT2S
39 11573 000747           JMP FLT2T+2
40 11574 102120           ADCZL 0,0
41 11575 040443           STA 0,FLT2S
```

```
10162 MPRTS
01 11576 021000 FLT2L:    LDA 0,0,2       ;FIRST WORD 2ND 4
02 11577 025400           LDA 1,0,3
03 11600 122414           SUB# 1,0,SZR
04 11601 000426           JMP FLT2D
05 11602 021001           LDA 0,1,2       ;2ND WORD 2ND 4
06 11603 025401           LDA 1,1,3
07 11604 106414           SUB# 0,1,SZR
08 11605 000420           JMP FLT2D-2
09 11606 102520           SUBZL 0,0
10 11607 101120           MOVZL 0,0
11 11610 113000           ADD 0,2
12 11611 117000           ADD 0,3
13 11612 010426           ISZ FLT2S
14 11613 000763           JMP FLT2L       ;DO NXT 2 2ND 4
15 11614 112400           SUB 0,2
16 11615 112400           SUB 0,2
17 11616 175400           INC 3,3
18 11617 175620           INCZR 3,3       ;+5 TO STORE
19 11620 175500           INCL 3,3        ;BUFFER ADDRESS
20 11621 010425           ISZ FLT2E       ;DONE ALL SKIP
21 11622 000716           JMP FLT2T
22                        LCALL RETU2     ;TEST PASSED RETURN
23 11623 060202           NIOC MAP
24 11624 006073           JSR @RETL2
25
26                ;ERROR RETURN FROM THIS TEST
27
28 11625 151400           INC 2,2
29 11626 175400           INC 3,3
30 11627 040416 FLT2D:    STA 0,FLT2F
31 11630 020411           LDA 0,F2WDS     ;CALC REAL FAILURE
32 11631 103120           ADDZL 0,0       ;ADDRESS
33 11632 101120           MOVZL 0,0       ;COULD BE OFF BY 8
34 11633 117000           ADD 0,3
35 11634 020411           LDA 0,FLT2F
36 11635 054410           STA 3,FLT2F
37                        LCALL ERRFT
38 11636 060202           NIOC MAP
39 11637 006072           JSR @ERRET
40 11640 000000 FLT2S:    0
41
42 11641 000000 F2WDS:    0
43 11642 000000 FLT2A:    0
44 11643 000000 FLT2B:    0
45 11644 000000 FLT2C:    0
46 11645 000000 FLT2F:    0
47 11646 000000 FLT2E:    0
```

```
10163 MPRTS
01
02
                                .TITL MTTES
04                  ;MAGNETIC TAPE TEST COMPATABLE
05                  ;WITH THE DIAGNOSTIC LINKER
06
07                  ;DEFINITIONS  BLOCK TO LINKER
08                          NEXTT MT.00
09          011647 LMEML=.
10          000117          .LOC LPG0
11 00117 011650             MT.00
12          000120 LPG0=.
13          011647          .LOC LMEML
14 11647 000000             0           ;INTERRUPT TIMEOUT SWITCH
15 11650 011672 MT.00:                  MT.01
16 11651 011725                         MT.02
17 11652 000000                         0
18 11653 000000                         0
19 11654 177777                         -1
20 11655 176000                         176000
21 11656 012451                         MT.XI
22 11657 012451                         MT.XI
23                                      .TXTE (
24 11660 040515 MAGNETIC TEST(
25          047107
26          152305
27          141711
28          152240
29          050101
30          120305
31          142724
32          152123
33          000000
```

```
10164 MPRTS
01
02
03                  ;MAGNETIC TAPE TEST INITIALIZE
04                  ;DETERMINE IF AN MTA CONTROL AND
05                  ;A DRIVE 0 EXIST
06
07 11672 102000 MT.01:  ADC 0,0
08 11673 062022         DOB 0,MTA
09 11674 065422         DIB 1,MTA           ;READ ADDRS BACK
10 11675 125005         MOV 1,1,SNR         ;SKIP IF MTA CONTROL
11 11676 000411         JMP MT.1A           ;NO MAG TAPE
12 11677 126400         SUB 1,1
13 11700 065022         DOA 1,MTA           ;DRIVE TO REGA
14 11701 070422         DIA 2,MTA           ;GET STATUS
15 11702 151232         MOVZR* 2,2,SZC
16 11703 000406         JMP MT.1B
17 11704 153100         ADDL 2,2
18 11705 151122         MOVZL 2,2,SZC
19 11706 000403         JMP MT.1B
20 11707 040743 MT.1A:  STA 0,MT.00+2
21 11710 001400         JMP 0,3
22                  ;MAG TAPE CONTROL AND A DRIVE 0 EXIST
23                  ;ENABLE TAPE TEST AND ENTER INTERRUPT VECTORS
24 11711 020410 MT.1B:  LDA 0,MT10
25 11712 061122         DOAS 0,MTA          ;REWIND DRIVE
26 11713 126400         SUB 1,1
27 11714 046556         STA 1,@MT.TT
28 11715 020405         LDA 0,MT.K1         ;DEV #
29 11716 024405         LDA 1,MT.K2         ;IO MSK
30 11717 030405         LDA 2,MT.K3         ;INTERRUPT DIRECTOR
31 11720 002064         JMP @EINTS          ;ENTER INT VECTORS
```

```
10165 MPRTS
01
02
03 11721 000010 MT10:   10
04 11722 000022 MT.K1:  MTA
05 11723 000077 MT.K2:  77
06 11724 012201 MT.K3:  MT.ID
07
08              ;EXECUTE ENTRY POINT
09              ;MT.00+2=ADDRESS PROCESS OR=0 NO SCRATCH
10
11 11725 030725 MT.02:  LDA 2,MT.00+2   ;GET INTR SW
12 11726 151004         MOV 2,2,SZR     ;SKIP=NO SCRATCH
13 11727 001000         JMP 0,2         ;GO TO SEVICE
14                      LCALL ASCRA     ;GET 1K SCR
15 11730 060202         NIOC MAP
16 11731 006053         JSR @ASCRA
17 11732 002455         JMP @MT.XX      ;NO SCRATCH AVAIL
18                      LCALL ADMAP     ;ASSIGN IT TO DCH
19 11733 060202         NIOC MAP
20 11734 006074         JSR @ADMAP
21 11735 002452         JMP @MT.XX      ;NO DCH AVAIL
22                      LCALL ARANG
23 11736 060202         NIOC MAP
24 11737 006062         JSR @ARANG
25 11740 105000         MOV 0,1
26 11741 030450         LDA 2,MT.6
27 11742 102400         SUB 0,0
28 11743 040530         STA 0,MT.KK     ;0 # 1K'S EXTRA
29                      LCALL ADIVI
30 11744 060202         NIOC MAP
31 11745 006063         JSR @ADIVI
32 11746 100405         NEG 0,0,SNR     ;(0)=# 1K'S TO EXPAND
33 11747 000412         JMP MT.2C
34              MT.2L:  LCALL ESCRA     ;TRY TO GET 1K
35 11750 060202         NIOC MAP
36 11751 006054         JSR @ESCRA
37 11752 000407         JMP MT.2C       ;NO MORE AVAZC
38                      LCALL EDMAP     ;ALSO EXPND DCH 1K
39 11753 060202         NIOC MAP
40 11754 006075         JSR @EDMAP
41 11755 000426         JMP MT.2R       ;CANT EXPAND DCH
42 11756 010515         ISZ MT.KK       ;#1 #1K'S ASSIGNED
43 11757 101404         INC 0,0,SZR
44 11760 000770         JMP MT.2L
45
46
```

```
10166 MPRTS
01              ;SOME AMOUNT (1K TO 6K) SCRATCH AND DCH
02              ;ARE ASSIGNED TO THIS TEST
03              ;PICK START BUFFER WITHIN FIRST 400 WORDS
04
05              MT.2C:  LCALL ARANG
06 11761 060202         NIOC MAP
07 11762 006062         JSR @ARANG
08 11763 105000         MOV 0,1
09 11764 030426         LDA 2,MT256
10                      LCALL ADIVI
11 11765 060202         NIOC MAP
12 11766 006063         JSR @ADIVI
13 11767 024106         LDA 1,SCFLO
14 11770 107000         ADD 0,1
15 11771 044505         STA 1,MTCST     ;DATA START ADDRESS
16 11772 024110         LDA 1,DCHLO
17 11773 107000         ADD 0,1
18 11774 044503         STA 1,MTCST     ;CHANNEL START ADDRESS
19 11775 024476         LDA 1,MT.KK     ;# 1K'S AVAIL
20 11776 127120         ADDZL 1,1       ;*4
21 11777 020411         LDA 0,MT.3
22 12000 107000         ADD 0,1         ;AC1=# RECORDS THAT FIT
23 12001 044473         STA 1,MT.BK     ;INTO AVAILABLE BUFFER
24 12002 000411         JMP MT.03       ;DETERMINE NEXT OP
```

```
10167 MPRTS
01
02
03                ;RELEASE 1K THAT COULDNT BE ASSIGNED TO DCH
04
05                MT.2R:  LCALL RSCRA
06 12003 060202           NIOC MAP
07 12004 006055           JSR @RSCRA
08 12005 063077           HALT                ;NOT PROBABLE HALT
09 12006 000753           JMP MT.2C
10
11 12007 012451 MT.XX:    MT.XI
12 12010 000003 MT.3:     3
13 12011 000006 MT.6:     6
14 12012 000400 MT256:    256.
15
16
```

```
10168 MPRTS
01                ;DATA CHANNEL AND SCRATCH ARE ASSIGNED
02                ;DETERMINE WHAT TO DO WITH DRIVE
03
04 12013 022457 MT.03:    LDA 0,@MT.TT
05 12014 100644           NEGOR 0,0,SZR       ;SKIP=DRIVE REWINDING
06 12015 000406           JMP MT.3A
07 12016 061022           DOA 0,MTA
08 12017 064422           DIA 1,MTA
09 12020 125223           MOVZR 1,1,SNC       ;15=1 IS DRV RDY
10 12021 002766           JMP @MT.XX          ;STILL REWINDING EXIT
11 12022 012450           ISZ @MT.TT          ;SET WRITE STATE
12 12023 101003 MT.3A:    MOV 0,0,SNC         ;WRITE SELECT CARRY=1
13 12024 000516           JMP MT.3R           ;TAPE IS IN READ MODE
14                        LCALL ARANG
15 12025 060202           NIOC MAP
16 12026 006062           JSR @ARANG
17 12027 105000           MOV 0,1
18 12030 030007           LDA 2,MT64.
19 12031 020443           LDA 0,MT.BK
20 12032 112400           SUB 0,2
21                        LCALL ADIVI         ;WRITE AT LEAST
22 12033 060202           NIOC MAP
23 12034 006063           JSR @ADIVI
24 12035 024437           LDA 1,MT.BK         ;ONE BUFFER FULL
25 12036 123000           ADD 1,0
26 12037 030433           LDA 2,MT.TT
27 12040 041002           STA 0,2,2           ;# BLOCKS TO WRITE
28 12041 041001           STA 0,1,2           ;# BLOCKS BKSP/READ
29 12042 125300           MOVS 1,1            ;# BLOCKS *400
30 12043 124600           NEGR 1,1            ;-FOR WC
31 12044 125400           INC 1,1             ;TAKE OFF 4
32 12045 125500           INCL 1,1
33 12046 044427           STA 1,MT.BL         ;BUFFER LENGTH
34                        LCALL FRANG
35 12047 060202           NIOC MAP
36 12050 006071           JSR @FRANG
37 12051 040433           STA 0,MTDW1         ;GET 4 RAN#'S
38 12052 044433           STA 1,MTDW2         ;FOR DATA
39 12053 050433           STA 2,MTDW3
40                        LCALL ARANG
41 12054 060202           NIOC MAP
42 12055 006062           JSR @ARANG
43 12056 040431           STA 0,MTDW4
44 12057 030417           LDA 2,MTDST
45 12060 034420           LDA 3,MTDWX
46 12061 126120           ADCZL 1,1
47 12062 125120           MOVZL 1,1           ;1=-4
48 12063 021400           LDA 0,0,3           ;MOV TO FIRST 4 WDS
49 12064 041000           STA 0,0,2           ;IN DATA BUFFER
50 12065 175400           INC 3,3
51 12066 151400           INC 2,2
52 12067 125404           INC 1,1,SZR
53 12070 000773           JMP .-5
54 12071 000421           JMP MTFIL
```

```
10169 HPRTS
01
02 12072 012101 MT.TT: MTCTB
03 12073 000000 MT.KK: 0          ;# 1K'S ASSIGNED
04 12074 000000 MT.BK: 0          ;# TAPE BLOCKS AVAILABLE
05 12075 000000 MT.BL: 0          ;# WORDS IN BUFFER
06 12076 000000 MTDST: 0          ;DATA START ADDRESS
07 12077 000000 MTCST: 0          ;SAME BUT FOR DCH
08              ;TEST CONTROL TABLE
09 12100 012104 MTDWX: MTDW1
10 12101 000000 MTCTB: 0          ;MODE CONTROL REG
11 12102 000000          0        ;WRITE RECORD CTR
12 12103 000000          0        ;READ BKSPA CTR
13 12104 000000 MTDW1: 0
14 12105 000000 MTDW2: 0
15 12106 000000 MTDW3: 0
16 12107 000000 MTDW4: 0
17 12110 000000 MT.CA: 0          ;CURRENT BLOCK ADRS
18 12111 000000 MT.RK: 0          ;# RECORDS IN BUFFER
```

```
10170 HPRTS
01
02
03              ;FIRST 4 WORDS IN BUFFER ARE FILLED
04              ;MOVE THEM TO REST OF BUFFER
05              ;AND START WRITING
06 12112 024763 MTFIL:  LDA 1,MT.RL
07 12113 021374         LDA 0,-4,2
08 12114 041000         STA 0,0,2
09 12115 151400         INC 2,2
10 12116 125404         INC 1,1,SZR
11 12117 000774         JMP .-4
12 12120 020522         LDA 0,MTMK1
13 12121 063022         DOC 0,MTA         ;LOAD WC
14 12122 024755         LDA 1,MTCST       ;CHANNEL START
15 12123 066022         DOB 1,MTA         ;LOAD CA
16 12124 030465         LDA 2,MT.WI
17 12125 052546         STA 2,@MT00X      ;WRITE INT PROCESSOR
18 12126 030412         LDA 2,MT50        ;MT WRITE COMMAND
19 12127 020745         LDA 0,MT.BK
20 12130 040761         STA 0,MT.RK       ;# RECORDS 1 PASS BUFFER
21 12131 102000         ADC 0,0           ;SET BKSPACE SW
22 12132 040446         STA 0,MTBSW
23 12133 044755         STA 1,MT.CA       ;START RECORD ADRS
24 12134 071122         DOAS 2,MTA
25                      LCALL RETRN
26 12135 060202         NIOC MAP
27 12136 006061         JSR @RETRN
28 12137 000100 MT64,:  64.
29 12140 000050 MT50:   50
30 12141 000000 MT.EK: 0          ;READ RETRY CTR
```

```
10171 MPRTS
01                ;DRIVE IS IN READ STATE
02                ;READ AS MANY RECORDS AS POSSIBLE
03                ;INTO THE DATA BUFFER
04                ;AFTER BACKSPACING OVER ALL WRITTEN
05 12142 030730 MT.3R:  LDA 2,MT.TT
06 12143 025002         LDA 1,2,2
07 12144 020730         LDA 0,MT.BK
08 12145 122432         SUBZ# 1,0,SZC
09 12146 121000         MOV 1,0           ;(0)=#RECORDS TO READ
10 12147 040725         STA 0,MT.BK
11 12150 040741         STA 0,MT.RK
12 12151 020726         LDA 0,MTCST
13 12152 040736         STA 0,MT.CA
14 12153 062022         DOB 0,MTA         ;LOAD ADDRESS
15 12154 025002         LDA 1,2,2
16 12155 124400         NEG 1,1
17 12156 067022         DOC 1,MTA         ;WORD COUNT
18 12157 030501         LDA 2,MT.WB
19 12160 020420         LDA 0,MTBSW
20 12161 100044         COMO 0,0,SZR
21 12162 000412         JMP MTRDG
22 12163 052510         STA 2,@MT00X      ;BKSPA INTERRUPT HANDLER
23 12164 040414         STA 0,MTBSW
24 12165 040552         STA 0,MTRDS
25 12166 101500         INCL 0,0
26 12167 040752         STA 0,MT.EK       ;3 FOR RETRY CTR
27 12170 020451         LDA 0,MT40        ;BKSPA DRV 0
28 12171 061122         DOAS 0,MTA        ;START BKSPA
29                      LCALL RETRN
30 12172 060202         NIOC MAP
31 12173 000061         JSR @RETRN
32 12174 004466 MTRDG:  JSR MT.WB+2
33 12175 050542         STA 2,MTRDS
34                      LCALL RETRN
35 12176 060202         NIOC MAP
36 12177 000061         JSR @RETRN
37 12200 000000 MTBSW:  0
```

```
10172 MPRTS
01
02
03                ;INTERRUPT DISPATCHER
04
05 12201 032472 MT.ID:  LDA 2,@MT00X
06 12202 060622         DIAC 0,MTA
07 12203 040440         STA 0,MTSTA
08 12204 101133         MOVZL# 0,0,SNC    ;SKIP IS ERR FLAG
09 12205 061001         JMP 1,2           ;PROCESS NORML RET
10 12206 103132         ADDZL# 0,0,SZC    ;IS IT DATA LATE?
11 12207 000511         JMP MT.RE+2       ;TYPE ALL DATA LATES
12 12210 001000         JMP 0,2           ;PROCESS ERROR
13
14                ;WRITE INTERRUPT SERVICE ROUTINE
15 12211 112212 MT.WI:  .+1
16 12212 000433         JMP MT.WE
17 12213 016431         DSZ @MTWTX        ;-1 RECORDS TO WRITE
18 12214 000404         JMP MT.WM         ;MORE TO DO
19 12215 020523         LDA 0,MT.04       ;SET UP BACKSPACE
20 12216 042455         STA 0,@MT00X      ;COMPARE WRITE BUFFER
21 12217 001400         JMP 0,3
22                ;CONTINUE WRITING RECORDS
23 12220 020670 MT.WM:  LDA 0,MT.CA
24 12221 101300         MOVS 0,0
25 12222 101700         INCS 0,0          ;+400 TO ADRS
26 12223 040665         STA 0,MT.CA
27 12224 024653         LDA 1,MTCST
28 12225 014664         DSZ MT.RK         ;SKIP DONE FULL BUFF
29 12226 000405         JMP .+5           ;NOT AT EOB YET
30 12227 044651         STA 1,MT.CA       ;RESET ADDRS TO START
31 12230 121000         MOV 1,0
32 12231 024643         LDA 1,MT.BK       ;#BLOCKS IN BUFFER
33 12232 044657         STA 1,MT.RK
34 12233 062022 MT.WN:  DOB 0,MTA         ;LOAD CA
35 12234 024406         LDA 1,MTMK1
36 12235 067022         DOC 1,MTA         ;-256 WK
37 12236 030702         LDA 2,MT50        ;WRITE COM
38 12237 071122         DOAS 2,MTA        ;GO AGAIN
39 12240 001400         JMP 0,3
40 12241 000040 MT40:   40
41 12242 177400 MTMK1:  -256.
42 12243 000000 MTSTA:  0
43 12244 012102 MTWTX:  MTCTB+1
44
```

```
;0173 MPRTS
01
02                ;ERROR STATUS DURING WRITE
03                ;BACK UP AND TRY AGAIN IF NOT EOT
04                ;REWIND RESTART IF EOT
05
06 12245 105300 MT.WE:  MOVS 0,1
07 12246 125200         MOVR 1,1
08 12247 125202         MOVR 1,1,SZC     ;SKIP NOT EOT
09 12250 000453         JMP MTREW        ;=EOT REWIND
10 12251 102000 MTBK1:  ADC 0,0
11 12252 063022         DOC 0,MTA                ;-1 TO WC
12 12253 020405         LDA 0,MT.WB
13 12254 042417         STA 0,@MT00X
14 12255 030764         LDA 2,MT40       ;SPACE REVRS
15 12256 071122         DOAS 2,MTA
16 12257 001400         JMP 0,3
17                ;PROCESS BACKSPACE COMPLETE INTERRUPTS
18                ;BACKSPACE OVER ALL WRITTEN RESTART READ
19                ;BACKSPACE 1 RECORD  COMPLETE=RESTART WRITE/READ
20 12260 112261 MT.WB:  0,+1
21 12261 000437         JMP MT.RE+2      ;BACKSP ERR REWIND
22 12262 020626         LDA 0,MT.CA
23 12263 024726         LDA 1,MT.WI
24 12264 046407         STA 1,@MT00X     ;SET UP WRITE INTR
25 12265 026605         LDA 1,@MT.TT
26 12266 125222         MOVZR 1,1,SZC    ;SKP IS READ MODE
27 12267 000744         JMP MT.WA        ;WRITING
28 12270 024404         LDA 1,MT.RI      ;SET UP READ INTR
29 12271 046402         STA 1,@MT00X
30 12272 000416         JMP MT.RC
31 12273 011652 MT00X: MT.00+2
```

```
;0174 MPRTS
01
02
03                ;READ INTERRUPT PROCESSOR
04
05 12274 112275 MT.RI:  0,+1
06 12275 000421         JMP MT.RE        ;READ ERROR STATUS
07 12276 010441         ISZ MTRDS        ;+1 #BLKS RD
08 12277 020611         LDA 0,MT.CA
09 12300 101300         MOVS 0,0         ;CA + 400
10 12301 101700         INCS 0,0
11 12302 040606         STA 0,MT.CA
12 12303 014606         DSZ MT.BK        ;READ TO FILL BUFFER
13 12304 000404         JMP MT.RC        ;NO READ 1 MORE
14 12305 024503         LDA 1,MT.05
15 12306 046765         STA 1,@MT00X     ;COMPARE BUFFER
16 12307 001400         JMP 0,3          ;NEXT NORMAL ENTRY
17 12310 062022 MT.RC:  DCB 0,MTA
18 12311 024731         LDA 1,MTMK1      ;READ
19 12312 067022         DCC 1,MTA        ;NEXT BLOCK
20 12313 152400         SUB 2,2          ;IN SEQUENCE
21 12314 071122         DOAS 2,MTA
22 12315 001400         JMP 0,3
23
24 12316 014623 MT.RE:  DSZ MT.EK        ;RE READ 3 TRYS
25 12317 000732         JMP MTBK1        ;NO TRY AGAIN
26 12320 020411         LDA 0,MT.NR      ;NON REC READ TYPEOUT
27 12321 042752         STA 0,@MT00X     ;NEXT NORMAL ENTRY
28 12322 001400         JMP 0,3
29
30
31                ;REWIND DRIVE CLEAR MODE
32
33 12323 020405 MTREW:  LDA 0,MT.10      ;REW
34 12324 061122         DOAS 0,MTA       ;TO CONTROL/DRV 0
35 12325 102400         SUB 0,0
36 12326 042406         STA 0,@MTTTX     ;SET TAPE REWINDING
37 12327 000772         JMP MTREW-2
38 12330 000010 MT.10:  10
39 12331 012432 MT.NR:  MTDER
40 12332 012104 MT.DX:  MTDW1
41 12333 012110         MTDW4+1
42 12334 012101 MTTTX:  MTCTB
43 12335 012076 MTDSX:  MTDST
44 12336 012074 MTBKX:  MT.BK
45 12337 000000 MTRDS:  0          ;# BLOCKS READ
```

```
10175 MPRTS
01                ;WRITE PASS COMPLETE RECHECK DATA FOR VALIDITY
02                ;READ PASS ENTERS AFTER CHECKING FOR 7 TRACK
03 12340 012341 MT.04:  .+1
04 12341 034771         LDA 3,MT.DX       ;START OF DATA RAN#'S
05 12342 032773         LDA 2,@MTDBX      ;START OF BUFFER
06 12343 021400         LDA 0,0,3         ;GET NEXT OF 4
07 12344 025000         LDA 1,0,2         ;GET ONE OF FIRST 4
08 12345 122414         SUB# 1,0,SZR      ;SHD BE=
09 12346 000464         JMP MTDER         ;ERROR IN ONE OF 4
10 12347 151400         INC 2,2           ;BUMP ADRS
11 12350 175400         INC 3,3
12 12351 020762         LDA 0,MT.DX+1
13 12352 116414         SUB# 0,3,SZR      ;SKP IS DONE FIRST 4
14 12353 000770         JMP MT.04+3
15 12354 036762         LDA 3,@MTRKX      ;#400 WORD BLOCKS
16 12355 175300         MOVS 3,3          ;*400
17 12356 174600         NEGR 3,3
18 12357 175400         INC 3,3           ;4 LESS COMPARES
19 12360 175500         INCL 3,3          ;ARE NEEDED
20 12361 021374         LDA 0,-4,2        ;GET WORD VALIDATED
21 12362 025000         LDA 1,0,2         ;GET WORD NOT VALIDATED
22 12363 106414         SUB# 0,1,SZR      ;SKP=
23 12364 000446         JMP MTDER         ;DATA ERROR
24 12365 055374         STA 3,-4,2        ;CLR BUFFER FOR NXT RD
25 12366 151400         INC 2,2           ;STP ADRS
26 12367 175404         INC 3,3,SZR       ;SKP DONE ALL
27 12370 000771         JMP .-7
28 12371 022743         LDA 0,@MTTTX      ;GET MODE SW
29 12372 101223         MOVZR 0,0,SNC     ;SKP=CHNG WRITE TO RD
30 12373 000403         JMP .+3
31 12374 012740         ISZ @MTTTX
32 12375 002412         JMP @MTFLX
33 12376 020741         LDA 0,MTRDS
34 12377 026407         LDA 1,@MTRDX      ;# BLKS TO RD
35 12400 106425         SUBZ 0,1,SNR      ;-#BLKS RD
36 12401 016733         DSZ @MTTTX        ;CHNG BK TO WRT MODE
37 12402 046424         STA 1,@MTRDX      ;REM BLKS TO RD
38 12403 125004         MOV 1,1,SZR       ;NONE LEFT RELEASE BUFFER
39 12404 002403         JMP @MTFLX        ;RESELECT BUFFER START
40 12405 000444         JMP MT.XI
41 12406 012103 MTRDX: MTCTB+2
42 12407 011761 MTFLX: MT.2C     ;RESELECT IN FIRST 256
```

```
10176 MPRTS
01                ;READ COMPLETE RE-ENTER TAPE TEST
02 12410 012411 MT.05:  .+1               ;IF 7 TRACK DRIVE
03 12411 022726         LDA 0,MTRDS
04 12412 042724         STA 0,@MTRKX      ;#BLKS TO COMPARE
05 12413 060422         DIA 0,MTA         ;CLR UNUSED BITS
06 12414 101300         MOVS 0,0
07 12415 103122         ADDZL 0,0,SZC     ;SKP IF 7 TRACK
08 12416 000723         JMP MT.04+1       ;9 TRACK COMP WD FOR WD
09 12417 030713         LDA 2,MT.DX       ;START 4 RAN#'S
10 12420 034713         LDA 3,MT.DX+1     ;END OF SAME
11 12421 024410         LDA 1,MT7TM       ;7 TRACK DATAMASK
12 12422 021000         LDA 0,0,2
13 12423 123400         AND 1,0           ;CLR ANY EXTRA BITS
14 12424 041000         STA 0,0,2
15 12425 151400         INC 2,2
16 12426 156414         SUB# 2,3,SZR
17 12427 000773         JMP .-5
18 12430 000711         JMP MT.04+1       ;NOW COMPARE
19 12431 037477 MT7TM: 37477
```

```
10177 MPRTS
01
02
03                ;TAPE DATA ERROR START TYPEOUTS
04
05                MTDER:  LCALL ERRCI
06 12432 060202           NIOC MAP
07 12433 006065           JSR @ERRCI
08 12434 000401           JMP .+1
09 12435 020430           LDA 0,MTTX1
10                        LCALL ERRTX
11 12436 060202           NIOC MAP
12 12437 006060           JSR @ERRTX
13 12440 022674           LDA 0,@MTTTX    ;GET MODE 1=WRITE 2=RD
14 12441 024602           LDA 1,MTSTA     ;GET LAST STATUS
15 12442 032422           LDA 2,@MTEKX    ;GET # RETRYS
16 12443 151620           INCZR 2,2
17 12444 151500           INCL 2,2
18                        LCALL ERROC
19 12445 060202           NIOC MAP
20 12446 006066           JSR @ERROC
21 12447 000401           JMP .+1
22 12450 004653           JSR MTREW       ;REWIND START OVER
23                MT.X1:  LCALL RDMAP     ;RELEASE ALL DCH
24 12451 060202           NIOC MAP
25 12452 006076           JSR @RDMAP
26 12453 102401           SUB 0,0,SKP
27 12454 000775           JMP MT.X1
28                MT.X2:  LCALL RSCRA     ;RELEASE ALL SCR
29 12455 060202           NIOC MAP
30 12456 006055           JSR @RSCRA
31 12457 101001           MOV 0,0,SKP
32 12460 000775           JMP MT.X2
33 12461 042612           STA 0,@MT00X    ;CLR SCR ASSIGNED
34                        LCALL RETRN
35 12462 060202           NIOC MAP
36 12463 006061           JSR @RETRN
37
38 12464 012141 MTEKX:  MT.EK
39 12465 012466 MTTX1:  .+1
40 12466 005215           .TXTE (<15><12>
41 12467 147515 MODE      STATUS  MT.EK(
42       142504
43       051411
44       040724
45       052724
46       004523
47       152115
48       142456
49       000113
```

```
10178 MPRTS
                          .TITL RTCTS
02                ;REAL TIME CLOCK TEST TO RUN WITH LINKER
03                ;IF A REAL TIME CLOCK EXISTS
04                ;RUNTIME WILL BE TYPED AT 5 MINUTES
05                ;15 MINUTES AND ON EACH HALF HOUR.
06                ;ALSO, FOLLOWING ANY ERROR TYPEOUT
07                ;OR ANY TYPE IN WITH ACS4=1
08                ;(SEE TTY TEST TO CLR TIMSW)
09                        NEXTT RT.00
10       012500 LMEML=.
11       000120           .LOC LPG0
12 00120 012501           RT.00
13       000121 LPG0=.
14       012500           .LOC LMEML
15 12500 000000           0       ;INTERRUPT TIMEOUT SWITCH
16 12501 012521 RT.00:    RT.01
17 12502 012552           RT.02
18 12503 000000           0
19 12504 000000           0
20 12505 177777           -1
21 12506 176000           176000
22 12507 012575           RT.03
23 12510 012575           RT.03
24 12511 142722           .TXTE (REAL TIME CLOCK(
25       146101
26       152240
27       046711
28       120305
29       146303
30       141717
31       000113
```

```
10179 MPRTS
01                ;DETERMINE WHETHER OR NOT A REAL TIME CLOCK EXISTS
02                ;ENABLE OR DISABLE TEST ACCORDINGLY
03 12521 060277 RT.01:  INTDS
04 12522 102000         ADC 0,0
05 12523 040760         STA 0,RT.00+2    ;DISABLES TEST
06 12524 060114         NIOS RTC         ;TURN CLOCK ON
07 12525 063514         SKPBZ RTC        ;SKIP MAYBE NO CLOCK
08 12526 000402         JMP .+2          ;CLOCK EXISTS
09 12527 063714         SKPDZ RTC        ;TRY FOR DONE =1
10 12530 000403         JMP .+3          ;CLOCK EXISTS
11                ;NO RTC OR SYSTEM EXIT WITH CLOCK DISABLED
12 12531 060177         INTEN
13 12532 001400         JMP 0,3
14 12533 102400         SUB 0,0
15 12534 040747         STA 0,RT.00+2    ;ENABLE CLOCK TEST
16 12535 020414         LDA 0,RT.02-1
17 12536 040744         STA 0,RT.00+1
18 12537 020406         LDA 0,RT.K1
19 12540 024406         LDA 1,RT.K2
20 12541 030406         LDA 2,RT.K3
21 12542 060214         NIOC RTC         ;TURN CLOCK OFF
22 12543 060177         INTEN            ;RE-ENABLE INTA'S
23 12544 002064         JMP @EINTS
24 12545 000014 RT.K1:  RTC
25 12546 000007 RT.K2:  7
26 12547 012631 RT.K3:  RT.ID
27 12550 000005 RTFIV:  5
```

```
10180 MPRTS
01                ;START CLOCK TEST IS NOT DELETED
02 12551 012552         RT.02
03 12552 020425 RT.02:  LDA 0,RT.K4
04 12553 040727         STA 0,RT.00+1
05 12554 102420         SUBZ 2,2
06 12555 101500         INCL 0,2
07 12556 024444         LDA 1,RT.K5
08 12557 044444         STA 1,RTSEC      ;TO COUNT 1 SECOND
09 12560 024441         LDA 1,RT.K6
10 12561 044443         STA 1,RTMIN      ;60 SEC'S =1MIN.
11 12562 024756         LDA 1,RTFIV
12 12563 131120         MOVZL 1,2
13 12564 044441         STA 1,RTCTR      ;TO COUNT DOWN 1ST
14 12565 050441         STA 2,RTCTR+1    ;2ND AFTER 10 MORE
15 12566 133000         ADD 1,2
16 12567 126400         SUB 1,1
17 12570 044103         STA 1,RTTIM
18 12571 126000         ADC 1,1
19 12572 044104         STA 1,TIMSW      ;SET RT=0 INHIBIT TIME
20 12573 050434         STA 2,RTCTR+2    ;3RD AT HALF HOUR
21 12574 061114         DOAS 0,RTC       ;TURN CLOCK ON 1K HZ
22                RT.03:  LCALL RETRN
23 12575 060202         NIOC MAP
24 12576 006061         JSR @RETRN
25 12577 012600 RT.K4:  RT.04
26 12600 020104 RT.04:  LDA 0,TIMSW
27 12601 101004         MOV 0,0,SZR      ;PRINT TIME
28 12602 000773         JMP RT.03        ;NOT YET
29 12603 102000         ADC 0,0
30 12604 040104         STA 0,TIMSW      ;RESET INH. SW
31 12605 020452         LDA 0,RTTEX
32                      LCALL ERRTX
33 12606 060202         NIOC MAP
34 12607 006060         JSR @ERRTX
35 12610 024103         LDA 1,RTTIM
36                      LCALL PDECI      ;ELAPSED TIME IN MINUTES
37 12611 060202         NIOC MAP
38 12612 006057         JSR @PDECI
39 12613 024105         LDA 1,ERTOT      ;# ERR TYPEOUTS
40 12614 125005         MOV 1,1,SNR
41 12615 000760         JMP RT.03
42                      LCALL PDECI      ;PRINT ERROR TOTAL
43 12616 060202         NIOC MAP
44 12617 006057         JSR @PDECI
45 12620 000755         JMP RT.03
```

```
10181 MPRTS
01 12621 000074 RT.K6: 60.
02 12622 001750 RT.K5: 1000.
03 12623 000000 RTSEC: 0
04 12624 000000 RTMIN: 0
05 12625 000000 RTCTR: 0
06 12626 000000          0
07 12627 000000          0
08 12630 000036          30.
09 12631 000114 RT.ID:   NIOS RTC
10 12632 014771          DSZ RTSEC        ;1 SECOND
11 12633 001400          JMP 0,3          ;NO
12 12634 020766          LDA 0,RT.K5
13 12635 040766          STA 0,RTSEC
14 12636 014766          DSZ RTMIN        ;1 MINUTE
15 12637 001400          JMP 0,3          ;NO
16 12640 010103          ISZ RTTIM        ;BUMP ELAPSED MINUTES
17 12641 020760          LDA 0,RT.K6
18 12642 040762          STA 0,RTMIN      ;RES. MIN. CTR
19 12643 014762          DSZ RTCTR        ;TIME TO PRINT
20 12644 001400          JMP 0,3          ;NOT YET
21 12645 126400          SUB 1,1
22 12646 044104          STA 1,TIMSW      ;CLR PR. INH. SW
23 12647 020757          LDA 0,RTCTR+1
24 12650 024757          LDA 1,RTCTR+2
25 12651 030757          LDA 2,RTCTR+3
26 12652 040753          STA 0,RTCTR
27 12653 044753          STA 1,RTCTR+1
28 12654 050753          STA 2,RTCTR+2
29 12655 001400          JMP 0,3
30 12656 001400          JMP 0,3 ;RESTRT CLK DISMISS INTR
31 12657 012660 RTTEX:   .+1
32 12660 005215          .TXTE (<15><12>R/T=(
33       127722
34       136724
35       000000
```

```
10182 MPRTS
01
                         .TITL TTTES
03                       NEXTT TT,00
04       012664 LMEML=.
05       000121          .LOC LPG0
06 000121 012665         TT,00
07       000122 LPG0=.
08       012664          .LOC LMEML
09 12664 000000          0        ;INTERRUPT TIMEOUT SWITCH
10 12665 012702 TT,00:   TT,01
11 12666 012725          TT,02
12 12667 000000          0        ;WAIT FOR INTERRUPT SW
13 12670 177700          -64.
14 12671 177777          -1
15 12672 176000          176000
16 12673 000000          0
17 12674 000000          0
18                       .TXTE (
19 12675 152324 TTY TEST(
20       120131
21       142724
22       152123
23       000000
24               ;INITIALIZE TTY TEST
25 12702 102400 TT,01:   SUB 0,0
26 12703 040520          STA 0,TT,CK      ;CLR CHAR COUNT
27 12704 040763          STA 0,TT,00+2    ;CLR WAIT INTR
28 12705 020430          LDA 0,TT,03      ;INTR ADRS
29 12706 054462          STA 3,TT,S3
30 12707 020411          LDA 0,TT,K1
31 12710 024411          LDA 1,TT,K2
32 12711 030411          LDA 2,TT,K3
33 12712 000064          JSR @EINTS       ;ENTER KYBORD INT SERV
34 12713 020410          LDA 0,TT,K4
35 12714 030410          LDA 2,TT,K5
36 12715 000064          JSR @EINTS       ;ENTER TTO INT SERV
37 12716 034452          LDA 3,TT,S3
38 12717 001400          JMP 0,3
39 12720 000010 TT,K1:   TTI
40 12721 000003 TT,K2:   3
41 12722 012736 TT,K3:   TT,TI
42 12723 000011 TT,K4:   TTC
43 12724 012772 TT,K5:   TT,TO
44               ;START TTY PRINTING
45 12725 102000 TT,02:   ADC 0,0
46 12726 040741          STA 0,TT,00+2    ;SET WAITING INT
47 12727 020470          LDA 0,TT,CR
48 12730 024434          LDA 1,TWAIT
49 12731 125005          MOV 1,1,SNR
50 12732 001111          DOAS 0,TTO       ;OUT CARG RET
51                       LCALL RETRN
52 12733 000202          NIOC MAP
53 12734 000061          JSR @RETRN
```

```
;0183 MPRTS
01
02                ;TTY INTR SERVICE
03 12735 012736 TT.03:  .+1
04 12736 054432 TT.TI:  STA 3,TT.S3
05 12737 020425         LDA 0,TWAIT
06 12740 064477         READS 1
07 12741 127100         ADDL 1,1
08 12742 125100         MOVL 1,1        ;SW4=1 IS PRINT TIME
09 12743 127103         ADDL 1,1,SNC
10 12744 000404         JMP TT.3A
11                ;SW4=1 INITIATE RUNTIME/ERROR TYPEOUT
12 12745 126400         SUB 1,1
13 12746 044104         STA 1,TIMSW
14 12747 000412         JMP TT.DI-1     ;IGNORE PRINT CHAR
15 12750 020717 TT.3A:  LDA 0,TT,00+2
16 12751 101004         MOV 0,0,SZR     ;SKP NOT ALRDY WAIT
17 12752 000407         JMP TT.DI-1     ;TTO BUSY EXIT
18 12753 064410         DIA 1,TTI
19 12754 065111         DCAS 1,TTO
20 12755 034444         LDA 3,TT.EN
21 12756 054445         STA 3,TT.CK
22 12757 102000         ADC 0,0
23 12760 040707         STA 0,TT.00+2
24 12761 060210         NIOC TTI
25 12762 002406 TT.DI:  JMP @TT.S3
26 12763 100000         00
27 12764 000000 TWAIT: 0
28 12765 000000 TT.S0: 0
29 12766 000000 TT.S1: 0
30 12767 000000 TT.S2: 0
31 12770 000000 TT.S3: 0
32 12771 000000 TT.SC: 0
```

```
;0184 MPRTS
01
02                ;TTY OUTPUT INTR HANDLER
03 12772 020431 TT.TO:  LDA 0,TT.CK
04 12773 060211         NIOC TTO
05 12774 054774         STA 3,TT.S3
06 12775 101004         MOV 0,0,SZR     ;SKP FOR LINE FEED
07 12776 000406         JMP TT.04       ;INTO PRINTING CHAR
08 12777 020421         LDA 0,TT.LF
09 13000 061111         DCAS 0,TTO
10 13001 020421         LDA 0,TT.SP     ;GET SPACE
11 13002 040421         STA 0,TT.CK     ;TO NXT OUT
12 13003 000757         JMP TT.DI       ;DISMISS INTR
13                ;OUTPUT SPACE TO Z
14 13004 024415 TT.04:  LDA 1,TT.EN
15 13005 122415         SUB# 1,0,SNR    ;SKP IS NOT Z YET
16 13006 000404         JMP TT.05
17 13007 061111         DCAS 0,TTO
18 13010 010413         ISZ TT.CK
19 13011 000751         JMP TT.DI
20                ;ALL CHARACTERS PRINTED STOP INTERRUPTS
21 13012 102400 TT.05:  SUB 0,0
22 13013 040654         STA 0,TT.00+2
23 13014 060211         NIOC TTO
24 13015 040406         STA 0,TT.CK
25 13016 000744         JMP TT.DI
26 13017 000215 TT.CR: 215
27 13020 000212 TT.LF: 212
28 13021 000333 TT.EN: 333
29 13022 000240 TT.SP: 240
30 13023 000000 TT.CK: 0
31 13024 000000 UMOSW: 0
```

```
10185 MPRTS
01
02
                                .TITL CATES
04                      ;CASSETTE TAPE TEST COMPATABLE
05                      ;WITH THE DIAGNOSTIC LINKER
06          000034 CAA=34
07
08                      ;DEFINITIONS  BLOCK TO LINKER
09                              NEXTT CA,00
10          013025 LMEML=.
11          000122                  .LOC LPG0
12 00122    013026                  CA,00
13          000123 LPG0=.
14          013025                  .LOC LMEML
15 13025    000000                  0       ;INTERRUPT TIMEOUT SWITCH
16 13026    013050 CA,00:           CA,01
17 13027    013103                  CA,02
18 13030    000000                  0
19 13031    000000                  0
20 13032    177777                  -1
21 13033    176000                  176000
22 13034    013611                  CA,XI
23 13035    013611                  CA,XI
24                                  .TXTE (
25 13036    040703 CASSETTE TAPE TEST(
26          051523
27          152305
28          142724
29          152240
30          050101
31          120305
32          142724
33          152123
34          000000
```

```
10186 MPRTS
01
02
03                      ;CASSETTE TAPE TEST INITIALIZE
04                      ;DETERMINE IF AN CAA CONTROL AND
05                      ;A DRIVE 0 EXIST
06
07 13050    102000 CA,01:   ADC 0,0
08 13051    062034          DOB 0,CAA
09 13052    065434          DIB 1,CAA       ;READ ADDRS BACK
10 13053    125005          MOV 1,1,SNR     ;SKIP IF CAA CONTROL
11 13054    000411          JMP CA,1A       ;NO MAG TAPE
12 13055    126400          SUB 1,1
13 13056    062034          DOA 1,CAA       ;DRIVE TO REGA
14 13057    072434          DIA 2,CAA       ;GET STATUS
15 13060    151232          MOVZR# 2,2,SZC
16 13061    000406          JMP CA,1B
17 13062    153100          ADDL 2,2
18 13063    151122          MOVZL 2,2,SZC
19 13064    000403          JMP CA,1B
20 13065    040743 CA,1A:   STA 0,CA,00+2
21 13066    001400          JMP 0,3
22                      ;CAS TAPE CONTROL AND A DRIVE 0 EXIST
23                      ;ENABLE TAPE TEST AND ENTER INTERRUPT VECTORS
24 13067    020410 CA,1B:   LDA 0,CA10
25 13070    061134          DOAS 0,CAA      ;REWIND DRIVE
26 13071    126400          SUB 1,1
27 13072    046556          STA 1,@CA,TT
28 13073    020405          LDA 0,CA,K1     ;DEV #
29 13074    024405          LDA 1,CA,K2     ;IO MSK
30 13075    030405          LDA 2,CA,K3     ;INTERRUPT DIRECTOR
31 13076    002064          JMP @EINTS      ;ENTER INT VECTORS
```

```
;0187 MPRTS
01
02
03 13077 000010 CA10:   10
04 13100 000034 CA,K1:  CAA
05 13101 000077 CA,K2:  77
06 13102 013357 CA,K3:  CA,ID
07
08              ;EXECUTE ENTRY POINT
09              ;CA,00+2=ADDRESS PROCESS OR=0 NO SCRATCH
10
11 13103 030725 CA,02:  LDA 2,CA,00+2   ;GET INTR SW
12 13104 151004         MOV 2,2,SZR     ;SKIP=NO SCRATCH
13 13105 001000         JMP 0,2         ;GO TO SEVICE
14                      LCALL ASCRA     ;GET 1K SCR
15 13106 060202         NIOC MAP
16 13107 006053         JSR @ASCRA
17 13110 002455         JMP @CA,XX      ;NO SCRATCH AVAIL
18                      LCALL ADMAP     ;ASSIGN IT TO DCH
19 13111 060202         NIOC MAP
20 13112 006074         JSR @ADMAP
21 13113 002452         JMP @CA,XX      ;NO DCH AVAIL
22                      LCALL ARANG
23 13114 060202         NIOC MAP
24 13115 006062         JSR @ARANG
25 13116 105000         MOV 0,1
26 13117 030450         LDA 2,CA,6
27 13120 102400         SUB 0,0
28 13121 040530         STA 0,CA,KK     ;0 = 1K'S EXTRA
29                      LCALL ADIVI
30 13122 060202         NIOC MAP
31 13123 006063         JSR @ADIVI
32 13124 100405         NEG 0,0,SNR     ;(0)=# 1K'S TO EXPAND
33 13125 000412         JMP CA,2C
34              CA,2L:  LCALL ESCRA     ;TRY TO GET 1K
35 13126 060202         NIOC MAP
36 13127 006054         JSR @ESCRA
37 13130 000407         JMP CA,2C       ;NO MORE AVAZC
38                      LCALL EDMAP     ;ALSO EXPND DCH 1K
39 13131 060202         NIOC MAP
40 13132 006075         JSR @EDMAP
41 13133 000426         JMP CA,2R       ;CANT EXPAND DCH
42 13134 010515         ISZ CA,KK       ;#1 #1K'S ASSIGNED
43 13135 101404         INC 0,0,SZR
44 13136 000770         JMP CA,2L
45
46
```

```
;0188 MPRTS
01              ;SOME AMOUNT (1K TO 6K) SCRATCH AND DCH
02              ;ARE ASSIGNED TO THIS TEST
03              ;PICK START BUFFER WITHIN FIRST 400 WORDS
04
05              CA,2C:  LCALL ARANG
06 13137 060202         NIOC MAP
07 13140 006062         JSR @ARANG
08 13141 105000         MOV 0,1
09 13142 030426         LDA 2,CA256
10                      LCALL ADIVI
11 13143 060202         NIOC MAP
12 13144 006063         JSR @ADIVI
13 13145 024106         LDA 1,SCRLO
14 13146 107000         ADD 0,1
15 13147 044505         STA 1,CADST     ;DATA START ADDRESS
16 13150 024110         LDA 1,DCHLO
17 13151 107000         ADD 0,1
18 13152 044503         STA 1,CACST     ;CHANNEL START ADDRESS
19 13153 024476         LDA 1,CA,KK     ;# 1K'S AVAIL
20 13154 127120         ADDZL 1,1       ;*4
21 13155 020411         LDA 0,CA,3
22 13156 107000         ADD 0,1         ;AC1=# RECORDS THAT FIT
23 13157 044473         STA 1,CA,BK     ;INTO AVAILABLE BUFFER
24 13160 000411         JMP CA,03       ;DETERMINE NEXT OP
25
26
27              ;RELEASE 1K THAT COULDNT BE ASSIGNED TO DCH
28
29              CA,2R:  LCALL RSCRA
30 13161 060202         NIOC MAP
31 13162 006055         JSR @RSCRA
32 13163 063077         HALT            ;NOT PROBABLE HALT
33 13164 000753         JMP CA,2C
34
35 13165 013611 CA,XX:  CA,XI
36 13166 000003 CA,3:   3
37 13167 000006 CA,6:   6
38 13170 000400 CA256:  256.
39
40
```

```
10189 MPRTS
01                ;DATA CHANNEL AND SCRATCH ARE ASSIGNED
02                ;DETERMINE WHAT TO DO WITH DRIVE
03
04 13171 022457 CA,03:  LDA 0,@CA.TT
05 13172 100644         NEGOR 0,0,SZR    ;SKIP=DRIVE REWINDING
06 13173 000406         JMP CA.3A
07 13174 061034         DOA 0,CAA
08 13175 064434         DIA 1,CAA
09 13176 125223         MOVZR 1,1,SNC    ;15=1 IS DRV RDY
10 13177 002766         JMP @CA.XX       ;STILL REWINDING EXIT
11 13200 012450         ISZ @CA.TT       ;SET WRITE STATE
12 13201 101003 CA.3A:  MOV 0,0,SNC      ;WRITE SELECT CARRY=1
13 13202 000516         JMP CA.3R        ;TAPE IS IN READ MODE
14                      LCALL ARANG
15 13203 060202         NIOC MAP
16 13204 006062         JSR @ARANG
17 13205 105000         MOV 0,1
18 13206 030507         LDA 2,CA64,
19 13207 020443         LDA 0,CA.BK
20 13210 112400         SUB 0,2
21                      LCALL ADIVI      ;WRITE AT LEAST
22 13211 060202         NIOC MAP
23 13212 006063         JSR @ADIVI
24 13213 024437         LDA 1,CA.BK      ;ONE BUFFER FULL
25 13214 123000         ADD 1,0
26 13215 030433         LDA 2,CA.TT
27 13216 041002         STA 0,2,2        ;# BLOCKS TO WRITE
28 13217 041001         STA 0,1,2        ;# BLOCKS BKSP/READ
29 13220 125300         MOVS 1,1         ;# BLOCKS *400
30 13221 124600         NEGR 1,1         ;-FOR WC
31 13222 125400         INC 1,1          ;TAKE OFF 4
32 13223 125500         INCL 1,1
33 13224 044427         STA 1,CA.BL      ;BUFFER LENGTH
34                      LCALL FRANG
35 13225 060202         NIOC MAP
36 13226 006071         JSR @FRANG
37 13227 040433         STA 0,CADW1      ;GET 4 RAN#'S
38 13230 044433         STA 1,CADW2      ;FOR DATA
39 13231 050433         STA 2,CADW3
40                      LCALL ARANG
41 13232 060202         NIOC MAP
42 13233 006062         JSR @ARANG
43 13234 040431         STA 0,CADW4
44 13235 030417         LDA 2,CADST
45 13236 034420         LDA 3,CADWX
46 13237 126120         ADCZL 1,1
47 13240 125120         MOVZL 1,1        ;1=-4
48 13241 021400         LDA 0,0,3        ;MOV TO FIRST 4 WDS
49 13242 041000         STA 0,0,2        ;IN DATA BUFFER
50 13243 175400         INC 3,3
51 13244 151400         INC 2,2
52 13245 125404         INC 1,1,SZR
53 13246 000773         JMP .-5
54 13247 000421         JMP CAFIL
```

```
10190 MPRTS
01
02 13250 013257 CA.TT: CACTB
03 13251 000000 CA.KK: 0          ;# 1K'S ASSIGNED
04 13252 000000 CA.BK: 0          ;# TAPE BLOCKS AVAILABLE
05 13253 000000 CA.BL: 0          ;# WORDS IN BUFFER
06 13254 000000 CADST: 0          ;DATA START ADDRESS
07 13255 000000 CACST: 0          ;SAME BUT FOR DCH
08                ;TEST CONTROL TABLE
09 13256 013262 CADWX: CADW1
10 13257 000000 CACTB: 0          ;MODE CONTROL REG
11 13260 000000          0        ;WRITE RECORD CTR
12 13261 000000          0        ;READ BKSPA CTR
13 13262 000000 CADW1: 0
14 13263 000000 CADW2: 0
15 13264 000000 CADW3: 0
16 13265 000000 CADW4: 0
17 13266 000000 CA.CA: 0          ;CURRENT BLOCK ADRS
18 13267 000000 CA.RK: 0          ;# RECORDS IN BUFFER
```

```
10191 MPRTS
01
02
03                ;FIRST 4 WORDS IN BUFFER ARE FILLED
04                ;MOVE THEM TO REST OF BUFFER
05                ;AND START WRITING
06 13270 024763 CAFIL:  LDA 1,CA,BL
07 13271 021374         LDA 0,-4,2
08 13272 041000         STA 0,0,2
09 13273 151400         INC 2,2
10 13274 125404         INC 1,1,SZR
11 13275 000774         JMP .-4
12 13276 020522         LDA 0,CAMK1
13 13277 063034         DOC 0,CAA       ;LOAD WC
14 13300 024755         LDA 1,CACST     ;CHANNEL START
15 13301 066034         DOB 1,CAA       ;LOAD CA
16 13302 030465         LDA 2,CA,WI
17 13303 052546         STA 2,@CA00X    ;WRITE INT PROCESSOR
18 13304 030412         LDA 2,CA50      ;CA WRITE COMMAND
19 13305 020745         LDA 0,CA,BK
20 13306 040761         STA 0,CA,RK     ;# RECORDS 1 PASS BUFFER
21 13307 102000         ADC 0,0         ;SET BKSPACE SW
22 13310 040446         STA 0,CABSW
23 13311 044755         STA 1,CA,CA     ;START RECORD ADRS
24 13312 071134         DOAS 2,CAA
25                      LCALL RETRN
26 13313 060202         NIOC MAP
27 13314 006061         JSR @RETRN
28 13315 000100 CA64,:  64.
29 13316 000050 CA50:   50
30 13317 000000 CA,EK:  0       ;READ RETRY CTR
```

```
10192 MPRTS
01              ;DRIVE IS IN READ STATE
02              ;READ AS MANY RECORDS AS POSSIBLE
03              ;INTO THE DATA BUFFER
04              ;AFTER BACKSPACING OVER ALL WRITTEN
05 13323 032730 CA,3R:  LDA 2,CA,TT
06 13321 025002         LDA 1,2,2
07 13322 020730         LDA 0,CA,BK
08 13323 122432         SUBZ# 1,0,SZC
09 13324 121000         MOV 1,0         ;(0)=#RECORDS TO READ
10 13325 040725         STA 0,CA,BK
11 13326 040741         STA 0,CA,RK
12 13327 020726         LDA 0,CACST
13 13330 040736         STA 0,CA,CA
14 13331 062034         DOB 0,CAA       ;LOAD ADDRESS
15 13332 025002         LDA 1,2,2
16 13333 124400         NEG 1,1
17 13334 067034         DOC 1,CAA       ;WORD COUNT
18 13335 030501         LDA 2,CA,WB
19 13336 020420         LDA 0,CABSW
20 13337 100044         COMO 0,0,SZR
21 13340 000412         JMP CARDG
22 13341 052510         STA 2,@CA00X    ;BKSPA INTERRUPT HANDLER
23 13342 040414         STA 0,CABSW
24 13343 040552         STA 0,CARDS
25 13344 101500         INCL 0,0
26 13345 040752         STA 0,CA,EK     ;3 FOR RETRY CTR
27 13346 020451         LDA 0,CA40      ;BKSPA DRV 0
28 13347 061134         DOAS 0,CAA      ;START BKSPA
29                      LCALL RETRN
30 13350 060202         NIOC MAP
31 13351 006061         JSR @RETRN
32 13352 004466 CARDG:  JSR CA,WB+2
33 13353 050542         STA 2,CARDS
34                      LCALL RETRN
35 13354 060202         NIOC MAP
36 13355 006061         JSR @RETRN
37 13356 000000 CABSW:  0
```

```
10193 MPRTS
01
02
03                ;INTERRUPT DISPATCHER
04
05 13357 032472 CA,ID:  LDA 2,*CA00X
06 13360 060634         DIAC 0,CAA
07 13361 040440         STA 0,CASTA
08 13362 101133         MOVZL# 0,0,SNC  ;SKIP IS ERR FLAG
09 13363 001001         JMP 1,2         ;PROCESS NORML RET
10 13364 103132         ADDZL# 0,0,SZC  ;IS IT DATA LATE?
11 13365 000511         JMP CA,RE+2     ;TYPE ALL DATA LATES
12 13366 001000         JMP 0,2         ;PROCESS ERROR
13
14                ;WRITE INTERRUPT SERVICE ROUTINE
15 13367 113370 CA,WI:  #,+1
16 13370 000433         JMP CA,WE
17 13371 016431         DSZ *CAWTX      ;-1 RECORDS TO WRITE
18 13372 000404         JMP CA,WM       ;MORE TO DO
19 13373 020523         LDA 0,CA,04     ;SET UP BACKSPACE
20 13374 042455         STA 0,*CA00X    ;COMPARE WRITE BUFFER
21 13375 001400         JMP 0,3
22                ;CONTINUE WRITING RECORDS
23 13376 020670 CA,WM:  LDA 0,CA,CA
24 13377 101300         MOVS 0,0
25 13400 101700         INCS 0,0        ;+400 TO ADRS
26 13401 040665         STA 0,CA,CA
27 13402 024653         LDA 1,CACST
28 13403 014664         DSZ CA,BK       ;SKIP DONE FULL BUFF
29 13404 000405         JMP .+5         ;NOT AT EOB YET
30 13405 044661         STA 1,CA,CA     ;RESET ADDRS TO START
31 13406 121000         MOV 1,0
32 13407 024643         LDA 1,CA,BK     ;#BLOCKS IN BUFFER
33 13410 044657         STA 1,CA,BK
34 13411 062034 CA,WN:  DOB 0,CAA       ;LOAD CA
35 13412 024406         LDA 1,CAMK1
36 13413 067034         DOC 1,CAA       ;-256 WK
37 13414 030702         LDA 2,CA50      ;WRITE COM
38 13415 071134         DOAS 2,CAA      ;GO AGAIN
39 13416 001400         JMP 0,3
40 13417 000040 CA40: 40
41 13420 177400 CAMK1: -256.
42 13421 000000 CASTA: 0
43 13422 013260 CAWTX: CACTB+1
44
```

```
10194 MPRTS
01
02                ;ERROR STATUS DURING WRITE
03                ;BACK UP AND TRY AGAIN IF NOT EOT
04                ;REWIND RESTART IF EOT
05
06 13423 105300 CA,WE:  MOVS 0,1
07 13424 125200         MOVR 1,1
08 13425 125202         MOVR 1,1,SZC    ;SKIP NOT EOT
09 13426 000453         JMP CAREW       ;*EOT REWIND
10 13427 102000 CABK1:  ADC 0,0
11 13430 063034         DOC 0,CAA               ;-1 TO WC
12 13431 020405         LDA 0,CA,+B
13 13432 042417         STA 0,*CA00X
14 13433 030764         LDA 2,CA40      ;SPACE REVRS
15 13434 071134         DOAS 2,CAA
16 13435 001400         JMP 0,3
17                ;PROCESS BACKSPACE COMPLETE INTERRUPTS
18                ;BACKSPACE OVER ALL WRITTEN RESTART READ
19                ;BACKSPACE 1 RECORD  COMPLETE=RESTART WRITE/READ
20 13436 113437 CA,WB:  #,+1
21 13437 000437         JMP CA,RE+2     ;BACKSP ERR REWIND
22 13440 020626         LDA 0,CA,CA
23 13441 024726         LDA 1,CA,+I
24 13442 046407         STA 1,*CA00X    ;SET UP WRITE INTR
25 13443 026605         LDA 1,*CA,TT
26 13444 125222         MOVZR 1,1,SZC   ;SKP IS READ MODE
27 13445 000744         JMP CA,WK       ;WRITING
28 13446 024404         LDA 1,CA,RI     ;SET UP READ INTR
29 13447 046402         STA 1,*CA00X
30 13450 000416         JMP CA,RC
31 13451 013030 CA00X: CA,00+2
```

```
10195 MPRTS
01
02
03                ;READ INTERRUPT PROCESSOR
04
05 13452 113453 CA,RI:  0,+1
06 13453 000421          JMP CA,RE        ;READ ERROR STATUS
07 13454 010441          ISZ CARDS        ;+1 #BLKS RD
08 13455 020611          LDA 0,CA,CA
09 13456 101300          MOVS 0,0         ;CA + 400
10 13457 101700          INCS 0,0
11 13460 040606          STA 0,CA,CA
12 13461 014606          DSZ CA,RK        ;READ TO FILL BUFFER
13 13462 000404          JMP CA,RC        ;NO READ 1 MORE
14 13463 024503          LDA 1,CA,05
15 13464 046765          STA 1,@CAR0X     ;COMPARE BUFFER
16 13465 001400          JMP 0,3          ;NEXT NORMAL ENTRY
17 13466 062034 CA,RC:   DCB 0,CAA
18 13467 024731          LDA 1,CAMK1      ;READ
19 13470 067034          DCC 1,CAA        ;NEXT BLOCK
20 13471 152400          SUB 2,2          ;IN SEQUENCE
21 13472 071134          DOAS 2,CAA
22 13473 001400          JMP 0,3
23
24 13474 014623 CA,RE:   DSZ CA,EK        ;RE READ 3 TRYS
25 13475 000732          JMP CABK1        ;NO TRY AGAIN
26 13476 020411          LDA 0,CA,NR      ;NON REC READ TYPEOUT
27 13477 042752          STA 0,@CAR0X     ;NEXT NORMAL ENTRY
28 13500 001400          JMP 0,3
29
30
31                ;REWIND DRIVE CLEAR MODE
32
33 13501 020405 CAREW:   LDA 0,CA,10      ;REW
34 13502 061134          DOAS 0,CAA       ;TO CONTROL/DRV 0
35 13503 102400          SUB 0,0
36 13504 042406          STA 0,@CATTX     ;SET TAPE REWINDING
37 13505 000772          JMP CAREW-2
38 13506 000010 CA,10:   10
39 13507 013572 CA,NR:   CADER
40 13510 013262 CA,DX:   CADW1
41 13511 013266           CADW4+1
42 13512 013257 CATTX:   CACTB
43 13513 013254 CADSX:   CADST
44 13514 013252 CABKX:   CA,BK
45 13515 000000 CARDS:   0          ;# BLOCKS READ
```

```
10196 MPRTS
01                ;WRITE PASS COMPLETE RECHECK DATA FOR VALIDITY
02                ;READ PASS ENTERS AFTER CHECKING FOR 7 TRACK
03 13516 013517 CA,04:   .+1
04 13517 034771          LDA 3,CA,DX      ;START OF DATA RAM#'S
05 13520 032773          LDA 2,@CADSX     ;START OF BUFFER
06 13521 021400          LDA 0,0,3        ;GET NEXT OF 4
07 13522 025000          LDA 1,0,2        ;GET ONE OF FIRST 4
08 13523 122414          SUB# 1,0,SZR     ;SHD BE=
09 13524 000446          JMP CADER        ;ERROR IN ONE OF 4
10 13525 151400          INC 2,2          ;BUMP ADRS
11 13526 175400          INC 3,3
12 13527 020762          LDA 0,CA,DX+1
13 13530 116414          SUB# 0,3,SZR     ;SKP IS DONE FIRST 4
14 13531 000770          JMP CA,04+3
15 13532 036762          LDA 3,@CABKX     ;#400 WORD BLOCKS
16 13533 175300          MOVS 3,3         ;*400
17 13534 174600          NEGR 3,3
18 13535 175400          INC 3,3          ;4 LESS COMPARES
19 13536 175500          INCL 3,3         ;ARE NEEDED
20 13537 021374          LDA 0,-4,2       ;GET WORD VALIDATED
21 13540 025000          LDA 1,0,2        ;GET WORD NOT VALIDATED
22 13541 106414          SUB# 0,1,SZR     ;SKP=
23 13542 000430          JMP CADER        ;DATA ERROR
24 13543 055374          STA 3,-4,2       ;CLR BUFFER FOR NXT RD
25 13544 151400          INC 2,2          ;STP ADRS
26 13545 175404          INC 3,3,SZR      ;SKP DONE ALL
27 13546 000771          JMP .-7
28 13547 022743          LDA 0,@CATTX     ;GET MODE SW
29 13550 101223          MOVZR 0,0,SNC    ;SKP=CHNG WRITE TO RD
30 13551 000403          JMP .+3
31 13552 012740          ISZ @CATTX
32 13553 002412          JMP @CAFLX
33 13554 020741          LDA 0,CARDS
34 13555 026407          LDA 1,@CARDX     ;# BLKS TO RD
35 13556 106425          SUBZ 0,1,SNR     ;=#BLKS RD
36 13557 016733          DSZ @CATTX       ;CHNG BK TO WRT MODE
37 13560 046404          STA 1,@CARDX     ;REM BLKS TO RD
38 13561 125004          MOV 1,1,SZR      ;NONE LEFT RELEASE BUFFER
39 13562 002403          JMP @CAFLX       ;RESELECT BUFFER START
40 13563 000426          JMP CA,XI
41 13564 013261 CARDX:   CACTB+2
42 13565 013137 CAFLX:   CA,2C     ;RESELECT IN FIRST 256
```

```
10197 MPRTS
01                      ;READ COMPLETE RE-ENTER TAPE TEST
02 13566 013567 CA.05:  .+1                     ;IF 7 TRACK DRIVE
03 13567 020726         LDA 0,CARDS
04 13570 042724         STA 0,@CABKX            ;#BLKS TO COMPARE
05 13571 000726         JMP CA.04+1             ;9 TRACK COMP WD FOR WD
06
07
08                      ;TAPE DATA ERROR START TYPEOUTS
09
10                      CADER:  LCALL ERROI
11 13572 060202         NIOC MAP
12 13573 006065         JSR @ERROI
13 13574 000401         JMP .+1
14 13575 020430         LDA 0,CATX1
15                      LCALL ERRTX
16 13576 060202         NIOC MAP
17 13577 006060         JSR @ERRTX
18 13600 022712         LDA 0,@CATTX            ;GET MODE 1=WRITE 2=RD
19 13601 024620         LDA 1,CASTA             ;GET LAST STATUS
20 13602 032422         LDA 2,@CAEKX            ;GET # RETRYS
21 13603 151620         INCZR 2,2
22 13604 151500         INCL 2,2
23                      LCALL ERROC
24 13605 060202         NIOC MAP
25 13606 006066         JSR @ERROC
26 13607 000401         JMP .+1
27 13610 004671         JSR CAREW               ;REWIND START OVER
28                      CA,XI:  LCALL RDMAP     ;RELEASE ALL DCH
29 13611 060202         NIOC MAP
30 13612 006076         JSR @RDMAP
31 13613 102401         SUB 0,0,SKP
32 13614 000775         JMP CA.XI
33                      CA,X2:  LCALL RSCRA     ;RELEASE ALL SCR
34 13615 060202         NIOC MAP
35 13616 006055         JSR @RSCRA
36 13617 101001         MOV 0,0,SKP
37 13620 000775         JMP CA.X2
38 13621 042630         STA 0,@CA00X            ;CLR SCR ASSIGNED
39                      LCALL RETRN
40 13622 060202         NIOC MAP
41 13623 006061         JSR @RETRN
42
43 13624 013317 CAEKX:  CA.EK
44 13625 013626 CATX1:  .+1
45 13626 005215         .TXTE (<15><12>
46 13627 147515 MODE    STATUS  CA.EK(
47       142504
48       051411
49       040724
50       052724
51       044523
52       040703
53       142456
54       042113
```

```
10198 MPRTS
                        .TITL LPTTS
02                  ;LINE PRINTER TEST COMPATABLE WITH THE DIAGNOSTIC LINKER
03                      .EXTT LP.00
04       013640 LMEML=.
05       000123         .LOC LPG0
06 000123 013641        LP.02
07       000124 LPG0=.
08       013640         .LOC LMEML
09 13640 000000         0       ;INTERRUPT TIMEOUT SWITCH
10 13641 013660 LP.00:  LP.01
11 13642 013701         LP.02
12 13643 000000         0
13 13644 000000         0
14 13645 001750         1000.
15 13646 176000         176000
16 13647 000000         0
17 13650 000000         0
18                      .TXTE (
19 13651 144714 LINE PRINTER(
20       142516
21       050240
22       144722
23       152116
24       151305
25       000000
26                  ;INITIALIZE LINE PRINTER TEST
27 13660 102000 LP.01:  ADC 0,0
28 13661 040762         STA 0,LP.00+2
29 13662 064417         DIA 1,LPT
30 13663 125223         MOVZR 1,1,SNC   ;LPT ON LINE
31 13664 001400         JMP 0,3         ;NO DON'T TEST IT
32 13665 102400         SUB 0,0
33 13666 040412         STA 0,LPCRF     ;CLR CARRET OUT
34 13667 040754         STA 0,LP.00+2
35 13670 040437         STA 0,LP.LK
36 13671 020404         LDA 0,LP.K1     ;DEV #
37 13672 024404         LDA 1,LP.K2     ;INTR MSK
38 13673 030404         LDA 2,LP.K3     ;INTR SERV ADRS
39 13674 002064         JMP @EINTS      ;PASSED TO INTA SERVICE
40 13675 000017 LP.K1:  LPT
41 13676 000017 LP.K2:  17
42 13677 014045 LP.K3:  LPINT
43 13700 000000 LPCRF:  0
```

```
#0199 MPRTS
01                ;EXECUTE PORTION OF LPT TEST
02                ;ENTERED AT RANDOM INTERVALS
03 13701 020426 LP,02:  LDA 0,LP,LK       ;GET LINE CTR
04 13702 101004         MOV 0,0,SZR       ;TIME FOR FORM FEED
05 13703 000426         JMP LP,2A         ;NO
06 13704 020774         LDA 0,LPCRF
07 13705 101005         MOV 0,0,SNR
08 13706 000411         JMP LPCRC
09 13707 102400         SUB 0,0
10 13710 040770         STA 0,LPCRF       ;CR HAS BEEN DONE
11 13711 020417         LDA 0,LP,FF
12 13712 126000 LPFFO:  ADC 1,1
13 13713 044730         STA 1,LP,00+2     ;SET WAITING INT
14 13714 061117         DOAS 0,LPT
15                      LCALL RETRN
16 13715 060202         NIOC MAP
17 13716 006061         JSR @RETRN
18 13717 020477 LPCRO:  LDA 0,LP,CR
19 13720 010760         ISZ LPCRF
20 13721 061117         DOAS 0,LPT
21 13722 063517         SKPBZ LPT
22 13723 000777         JMP .-1
23 13724 000755         JMP LP,02
24 13725 000133 LP,ZK:  133       ;Z+1
25 13726 000040 LP,40:  40        ;7 BIT SPACE
26 13727 000000 LP,LK:  0         ;LINE COUNTER
27 13730 000014 LP,FF:  14        ;FORM FEED CODE
28 13731 101404 LP,2A:  INC 0,0,SZR
29 13732 000413         JMP LP,2B         ;START NEXT LINE
30                      LCALL ARANG       ;RAN#
31 13733 060202         NIOC MAP
32 13734 006062         JSR @ARANG
33 13735 105000         MOV 0,1
34 13736 102400         SUB 0,0
35                ;RANDOMLY SELECT 10 TO 60 LINES TO PRINT
36 13737 030426         LDA 2,LP,50
37                      LCALL ADIVI
38 13740 060202         NIOC MAP
39 13741 006063         JSR @ADIVI
40 13742 024424         LDA 1 LP,10
41 13743 123000         ADD 1,0
42 13744 040763         STA 0,LP,LK
```

```
#0200 MPRTS
01                ;START PRINTING SPACE TO Z
02                ;WITH RANDOM STALLS AT EVERY 1 TO 9 LINES
03                LP,2B:  LCALL ARANG
04 13745 060202           NIOC MAP
05 13746 006062           JSR @ARANG
06 13747 105000           MOV 0,1
07 13750 102420           SUB 0,0
08 13751 030415           LDA 2,LP,10
09                        LCALL ADIVI
10 13752 060202           NIOC MAP
11 13753 006063           JSR @ADIVI
12 13754 040413           STA 0,LPSTALL
13 13755 020751           LDA 0,LP,40
14 13756 040406           STA 0,LP,CK
15 13757 102000           ADC 0,0
16 13760 040663           STA 0,LP,00+2     ;SET WAITING INTA
17 13761 004407           JSR LPFILL
18                        LCALL RETRN
19 13762 060202           NIOC MAP
20 13763 006061           JSR @RETRN
21 13764 000000 LP,CK:  0
22 13765 000062 LP,50:  50.
23 13766 000012 LP,10:  10.
24 13767 000000 LPSTALL: 0        ;STALL BY LINE CTR
```

```
10201 MPRTS
01                ;FILL PRINTER BUFFER UNTIL PRINT CYCLE
02                ;OR FORCE LINE FEED IF Z AND MORE LINES TO PRINT
03 13770 020774 LPFILL: LDA 0,LP.CK
04 13771 024734         LDA 1,LP.ZK
05 13772 106415         SUB# 0,1,SNR
06 13773 000417         JMP LPCR2
07 13774 061117         DOAS 0,LPT
08 13775 010767         ISZ LP.CK         ;ADVANCE TO NEXT CHAR
09 13776 126120         ADCZL 1,1         ;ZONE DETECT LOOPS
10 13777 152120         ADCZL 2,2
11 14000 063417         SKPBN LPT
12 14001 000767         JMP LPFILL
13 14002 151404         INC 2,2,SZR
14 14003 000775         JMP .-3
15                ;WAIT FOR BUFFER READY OR DETECT START OF PRINT
16                ;WHEN PRINTER ZONE IS FULL
17 14004 063517         SKPBZ LPT
18 14005 152121         ADCZL 2,2,SKP
19 14006 000762         JMP LPFILL
20 14007 125404         INC 1,1,SZR
21 14010 000773         JMP .-5
22 14011 001400         JMP 0,3           ;END OF ZONE EXIT
23 14012 020004 LPCR2:  LDA 0,LP.CR
24 14013 010665         ISZ LPCRF
25 14014 061117         DOAS 0,LPT
26 14015 001400         JMP 0,3
27 14016 000015 LP.CR:  15
```

```
10202 MPRTS
01                ;PRINT BUFFER IS FILLED TO "Z"
02                ;START LINE FEED ON ITS WAY
03                ;OR FORCE TO FORM FEED IF LAST LINE THIS PAGE
04 14017 014710 LPEND:  DSZ LP.LK
05 14020 000404         JMP .+4           ;DO A LINE FEED
06 14021 102220         ADCZR 0,0
07 14022 040621         STA 0,LP.00+2     ;FORCE A FORM FEED
08 14023 000416         JMP LP.LF-2
09 14024 020417         LDA 0,LP.LF
10 14025 061117         DOAS 0,LPT        ;PRINT REST OF LINE
11 14026 063517         SKPBZ LPT
12 14027 000777         JMP .-1
13 14030 000415         JMP LPINT
14 14031 020676 LPCRI:  LDA 0,LP.LK       ;INTA  WAS FROM A CR
15 14032 101005         MOV 0,0,SNR
16 14033 000404         JMP .+4 ;DECIDE IF LF OR FF
17 14034 102400         SUB 0,0
18 14035 040643         STA 0,LPCRF
19 14036 000761         JMP LPEND
20 14037 102220         ADCZR 0,0
21 14040 040603         STA 0,LP.00+2
22 14041 060217         NIOC LPT
23 14042 001400         JMP 0,3
24 14043 000012 LP.LF:  12
25 14044 013643 LP002:  LP.00+2
26
27                ;INTERRUPT SERV DISPATCH FOR LPT
28 14045 020633 LPINT:  LDA 0,LPCRF
29 14046 101004         MOV 0,0,SZR
30 14047 000762         JMP LPCRI
31 14050 020657         LDA 0,LP.LK
32 14051 101004         MOV 0,0,SZR       ;=0 WAS F/F
33 14052 000407         JMP .+7
34 14053 102400         SUB 0,0
35 14054 042770         STA 0,@LP002
36 14055 102000         ADC 0,0
37 14056 040651         STA 0,LP.LK       ;F/F DONE SW
38 14057 060217         NIOC LPT          ;CLR DONE
39 14060 001400         JMP 0,3 ;DISMISS INTR
40 14061 020703         LDA 0,LP.CK
41 14062 024643         LDA 1,LP.ZK
42 14063 106414         SUB# 0,1,SZR
43 14064 000704         JMP LPFILL        ;STILL FILLING BUFFER
44                ;MUST BE INTR FROM LINE FEED
45 14065 020641         LDA 0,LP.40
46 14066 040676         STA 0,LP.CK
47 14067 014700         DSZ LPSTALL       ;SKP FOR MOMENTARY STALL
48 14070 000700         JMP LPFILL
49 14071 102220         ADCZR 0,0
50 14072 042752         STA 0,@LP002
51 14073 060217         NIOC LPT
52 14074 001400         JMP 0,3
```

```
10203 MPRTS
01                      ;MULTIPLY DIVIDE TEST COMPATABLE WIITH
02                      ;THE DIAGNOSTIC LINKER
03                              .MACRO STORE
04                              JSR @IXTOR
05                      %
06                              .MACRO MLLCK
07                              JSR @IMCK
08                      %
09                              .MACRO DIVCK
10                              JSR @IDCK
11                      %
12                              .MACRO DIVER
13                              JSR @EDIV
14                      %
15                              .MACRO MLLER
16                              JSR @EMUL
17                      %
18                              NEXTT MUDI0
19              014075 LMEML=.
20              000124          .LOC LPG0
21      00124   014076          MUDI0
22              000125 LPG0=.
23              014075          .LOC LMEML
24      14075   000000          0       ;INTERRUPT TIMEOUT SWITCH
25
```

```
10204 MPRTS
01 14076 014115 MUDI0:  MUDI1
02 14077 014126         MDA30
03 14100 000000         0
04 14101 000000         0
05 14102 177777         -1
06 14103 176000         176000
07 14104 015051         MDTEX
08 14105 015051         MDTEX
09 14106 052515         .TXTE (MUL/DIV TEST(
10               127714
11               144504
12               120126
13               142724
14               152123
15               000000
16 14115 102000 MUDI1:  ADC 0,0
17 14116 040762         STA 0,MUDI0+2
18 14117 126400         SUB 1,1
19 14120 152400         SUB 2,2
20 14121 073301         DOCP 2,01
21 14122 125005         MOV 1,1,SNR     ;SKP=MUL/DIV EXISTS
22 14123 001400         JMP 0,3         ;NO MUL DIV EXIT
23 14124 040754         STA 0,MUDI0+2
24 14125 001400         JMP 0,3
```

```
10205 MPRTS
01                MDA00:  SETUP   ;0+0=0
02                        LCALL SETUL
03 14126 060202           NIOC MAP
04 14127 006067           JSR @SETUL
05                        STORE
06 14130 006547           JSR @IXTOR
07 14131 000000           0                       ;AC0
08 14132 000000           0                       ;AC1
09 14133 000000           0                       ;AC2
10 14134 006544           JSR @HMUL
11                        MULCK
12 14135 006544           JSR @IMCK
13 14136 000000           0
14 14137 000000           0
15 14140 000000           0
16                        LOOP
17                        LCALL LLOOP
18 14141 060202           NIOC MAP
19 14142 006070           JSR @LLOOP
20
21                ;A01:
22                        SETUP
23                        LCALL SETUL
24 14143 060202           NIOC MAP
25 14144 006067           JSR @SETLL
26                        STORE
27 14145 006532           JSR @IXTOR
28 14146 000000           0
29 14147 000000           0
30 14150 177777           -1
31 14151 006527           JSR @HMUL
32                        MULCK
33 14152 006527           JSR @IMCK
34 14153 000000           0
35 14154 000000           0
36 14155 177777           -1
37                        LOOP
38                        LCALL LLOOP
39 14156 060202           NIOC MAP
40 14157 006070           JSR @LLOOP
41
```

```
10206 MPRTS
01                ;A02:
02                        SETUP
03                        LCALL SETUL
04 14160 060202           NIOC MAP
05 14161 006067           JSR @SETLL
06                        STORE
07 14162 006515           JSR @IXTOR
08 14163 000000           0
09 14164 177777           -1
10 14165 000000           0
11 14166 006512           JSR @HMUL
12                        MULCK
13 14167 006512           JSR @IMCK
14 14170 000000           0
15 14171 000000           0
16 14172 000000           0
17                        LOOP
18                        LCALL LLOOP
19 14173 060202           NIOC MAP
20 14174 006070           JSR @LLOOP
21
22                ;A03:
23                        SETUP
24                        LCALL SETUL
25 14175 060202           NIOC MAP
26 14176 006067           JSR @SETLL
27                        STORE
28 14177 006500           JSR @IXTOR
29 14200 177777           -1
30 14201 000000           0
31 14202 000000           0
32 14203 006475           JSR @HMUL
33                        MULCK
34 14204 006475           JSR @IMCK
35 14205 000000           0
36 14206 177777           -1
37 14207 000000           0
38                        LOOP
39                        LCALL LLOOP
40 14210 060202           NIOC MAP
41 14211 006070           JSR @LLOOP
```

```
10207 MPRTS
01
02                ;A04:
03                        SETUP
04                        LCALL SETUL
05 14212 060202           NIOC MAP
06 14213 006067           JSR @SETUL
07                        STORE
08 14214 006463           JSR @IXTOR
09 14215 000000           0
10 14216 000001           1
11 14217 177777           -1
12 14220 006460           JSR @HMUL
13                        MULCK
14 14221 006460           JSR @IMCK
15 14222 000000           0
16 14223 177777           -1
17 14224 177777           -1
18                        LOOP
19                        LCALL LLOOP
20 14225 060202           NIOC MAP
21 14226 006070           JSR @LLOOP
22
23                ;A05:
24                        SETUP
25                        LCALL SETUL
26 14227 060202           NIOC MAP
27 14230 006067           JSR @SETLL
28                        STORE
29 14231 006446           JSR @IXTOR
30 14232 000000           0
31 14233 177777           -1
32 14234 000001           1
33 14235 006443           JSR @HMUL
34                        MULCK
35 14236 006443           JSR @IMCK
36 14237 000000           0
37 14240 177777           -1
38 14241 000001           1
39                        LOOP
40                        LCALL LLOOP
41 14242 060202           NIOC MAP
42 14243 006070           JSR @LLOOP
43
```

```
10208 MPRTS
01                ;A06:
02                        SETUP
03                        LCALL SETUL
04 14244 060202           NIOC MAP
05 14245 006067           JSR @SETLL
06                        STORE
07 14246 006431           JSR @IXTOR
08 14247 177777           -1
09 14250 177777           -1
10 14251 000000           0
11 14252 006426           JSR @HMUL
12                        MULCK
13 14253 006426           JSR @IMCK
14 14254 000000           0
15 14255 177777           -1
16 14256 000000           0
17                        LOOP
18                        LCALL LLOOP
19 14257 060202           NIOC MAP
20 14260 006070           JSR @LLOOP
21
22                ;A07:
23                        SETUP
24                        LCALL SETUL
25 14261 060202           NIOC MAP
26 14262 006067           JSR @SETLL
27                        STORE
28 14263 006414           JSR @IXTOR
29 14264 000001           1
30 14265 000002           2
31 14266 000002           2
32 14267 006411           JSR @HMUL
33                        MULCK
34 14270 006411           JSR @IMCK
35 14271 000000           0
36 14272 000005           5
37 14273 000002           2
38                        LOOP
39                        LCALL LLOOP
40 14274 060202           NIOC MAP
41 14275 006070           JSR @LLOOP
42 14276 000406           JMP MDA08
43 14277 014527 IXTOR:    SXTOR
44 14300 014761 HMUL:     XHMUL
45 14301 014473 IMCK:     MCK
46 14302 014474 IDCK:     DCK
47 14303 014773 HDIV:     XHDIV
```

```
10209 MPRTS
01                MDA08:  SETUP   ;EXPECT A DIVIDE ERROR
02                        LCALL SETUL
03 14304 060202           NIOC MAP
04 14305 006067           JSR @SETUL
05                        STORE           ;AND NO CHANGE TO ACS.
06 14306 006771           JSR @IXTOR
07 14307 000000           0
08 14310 000000           0
09 14311 000000           0
10 14312 006771           JSR @HDIV
11                        DIVCK
12 14313 006767           JSR @IDCK
13 14314 000000           0
14 14315 000000           0
15 14316 000000           0
16                        LOOP
17                        LCALL LLOOP
18 14317 060202           NIOC MAP
19 14320 006070           JSR @LLOOP
20
21                ;A09:
22                        SETUP   ;EXPECT DIVIDE ERROR.
23                        LCALL SETUL
24 14321 060202           NIOC MAP
25 14322 006067           JSR @SETUL
26                        STORE           ;NO CHANGE TO ACS.
27 14323 006754           JSR @IXTOR
28 14324 177777           -1
29 14325 177777           -1
30 14326 177777           -1
31 14327 006754           JSR @HDIV
32                        DIVCK
33 14330 006752           JSR @IDCK
34 14331 177777           -1
35 14332 177777           -1
36 14333 177777           -1
37                        LOOP
38                        LCALL LLOOP
39 14334 060202           NIOC MAP
40 14335 006070           JSR @LLOOP
41
```

```
10210 MPRTS
01                ;A10:
02                        SETUP   ;DIVIDE ERROR SHOULD
03                        LCALL SETUL
04 14336 060202           NIOC MAP
05 14337 006067           JSR @SETLL
06                        STORE           ;SET THE CARRY
07 14340 006737           JSR @IXTOR
08 14341 177777           -1
09 14342 177777           -1
10 14343 177777           -1
11 14344 101020           MOVZ 0,0
12 14345 006736           JSR @HDIV
13 14346 101003           MOV 0,0,SNC
14                        DIVER
15 14347 006522           JSR @EDIV
16                        LOOP
17                        LCALL LLOOP
18 14350 060202           NIOC MAP
19 14351 006070           JSR @LLOOP
20
21                ;A11:
22                        SETUP
23                        LCALL SETUL
24 14352 060202           NIOC MAP
25 14353 006067           JSR @SETLL
26                        STORE
27 14354 006723           JSR @IXTOR
28 14355 000000           0
29 14356 000000           0
30 14357 000001           1
31 14360 006723           JSR @HDIV
32                        DIVCK
33 14361 006721           JSR @IDCK
34 14362 000000           0
35 14363 000000           0
36 14364 000001           1
37                        LOOP
38                        LCALL LLOOP
39 14365 060202           NIOC MAP
40 14366 006070           JSR @LLOOP
```

```
10211 MPRTS
01                ;A12:
02                        SETUP   ;NO DIVIDE ERROR SHOULD
03                        LCALL SETUL
04 14367 060202           NIOC MAP
05 14370 006067           JSR @SETLL
06                        STORE           ;OCCURE AND CARRY SHOULD
07 14371 006706           JSR @IXTOR
08 14372 000000           0               ;BE A ZERO.
09 14373 000000           0
10 14374 000001           1
11 14375 101040           MOVO 0,0
12 14376 006705           JSR @HDIV
13 14377 101002           MOV 0,0,SZC
14                        DIVER
15 14400 006471           JSR @EDIV
16                        LOOP
17                        LCALL LLOOP
18 14401 060202           NIOC MAP
19 14402 006070           JSR @LLOOP
20
21                ;A13:
22                        SETUP   ;4/2=2
23                        LCALL SETUL
24 14403 060202           NIOC MAP
25 14404 006067           JSR @SETLL
26                        STORE
27 14405 006672           JSR @IXTOR
28 14406 000000           0
29 14407 000004           4
30 14410 000002           2
31 14411 006672           JSR @HDIV
32                        DIVCK
33 14412 006670           JSR @IDCK
34 14413 000000           0
35 14414 000002           2
36 14415 000002           2
37                        LOOP
38                        LCALL LLOOP
39 14416 060202           NIOC MAP
40 14417 006070           JSR @LLOOP
41
```

```
10212 MPRTS
01                ;A14:
02                        SETUP   ;CHECK REMAINDER
03                        LCALL SETUL
04 14420 060202           NIOC MAP
05 14421 006067           JSR @SETLL
06                        STORE
07 14422 006655           JSR @IXTOR
08 14423 000000           0
09 14424 077777           77777
10 14425 100000           100000
11 14426 006655           JSR @HDIV
12                        DIVCK
13 14427 006653           JSR @IDCK
14 14430 077777           77777
15 14431 000000           0
16 14432 100000           100000
17                        LOOP
18                        LCALL LLOOP
19 14433 060202           NIOC MAP
20 14434 006070           JSR @LLOOP
21
22                ;A15:
23                        SETUP
24                        LCALL SETUL
25 14435 060202           NIOC MAP
26 14436 006067           JSR @SETLL
27                        STORE
28 14437 006640           JSR @IXTOR
29 14440 000000           0
30 14441 177777           -1
31 14442 177777           -1
32 14443 006640           JSR @HDIV
33                        DIVCK
34 14444 006636           JSR @IDCK
35 14445 000000           0
36 14446 000001           1
37 14447 177777           -1
38                        LOOP
39                        LCALL LLOOP
40 14450 060202           NIOC MAP
41 14451 006070           JSR @LLOOP
```

```
10213 MPRTS
01                ;A16:
02                        SETUP
03                        LCALL SETUL
04 14452 060202           NIOC MAP
05 14453 006067           JSR @SETUL
06                        STORE
07 14454 006623           JSR @IXTOR
08 14455 000001           1
09 14456 000000           0
10 14457 000002           2
11 14460 006623           JSR @MDIV
12                        DIVCK
13 14461 006621           JSR @IDCK
14 14462 000000           0
15 14463 100000           100000
16 14464 000002           2
17                        LOOP
18                        LCALL LLOOP
19 14465 060202           NIOC MAP
20 14466 006070           JSR @LLOOP
21
22                ;A17:
23 14467 002401           JMP @,+1
24 14470 014545           MTST
25 14471 015012 EDIV:     DERR
26 14472 015005 EMUL:     MERR
```

```
10214 MPRTS
01
02 14473 101021 MCK:      MOVZ 0,0,SKP      ;CHECK MUL RESULT
03 14474 101040 DCK:      MOVO 0,0          ;CHECK DIV RESULT
04 14475 054444           STA 3,XCKRET
05 14476 035402           LDA 3,2,3
06 14477 156414           SUB# 2,3,SZR
07 14500 000411           JMP CK1           ;AC2 WRONG
08 14501 034440           LDA 3,XCKRET
09 14502 031400           LDA 2,0,3
10 14503 035401           LDA 3,1,3
11 14504 112415           SUB# 0,2,SNR      ;CHECK AC0
12 14505 136414           SUB# 1,3,SZR      ;CHECK AC1
13 14506 000403           JMP CK1           ;ERROR
14 14507 034432           LDA 3,XCKRET
15 14510 001403           JMP 3,3
16 14511 034430 CK1:      LDA 3,XCKRET
17 14512 021400           LDA 0,0,3
18 14513 025401           LDA 1,1,3
19 14514 031402           LDA 2,2,3
20 14515 040556           STA 0,OKAC
21 14516 044556           STA 1,OKMQ
22 14517 050556           STA 2,OKMD
23
24 14520 101002 CK2:      MOV 0,0,SZC       ;IF C(CARRY)=0 ITS MUL ERR
25 14521 000403           JMP .+3           ;OTHERWISE ITS A DIVIDE ER
26                        MULER
27 14522 006750           JSR @EMUL
28 14523 101001           MOV 0,0,SKP
29                        DIVER
30 14524 006745           JSR @EDIV
31 14525 034414           LDA 3,XCKRET
32 14526 001403           JMP 3,3
33
```

```
;0215 MPRTS
01 14527 021400 SXTOR:  LDA 0,0,3       ;PICK UP ARGUEMENTS
02 14530 025401         LDA 1,1,3       ;AND STORE IN ORIG
03 14531 031402         LDA 2,2,3       ;NUMBERS TABLE.
04 14532 042404         STA 0,@XOAC
05 14533 046404         STA 1,@XOMQ
06 14534 052404         STA 2,@XOMD
07 14535 001403         JMP 3,3
08 14536 014751 XOAC:   OAC
09 14537 014752 XOMQ:   OMQ
10 14540 014753 XOMD:   OMD
11 14541 000000 XCKRET: 0
12 14542 014761 IHMUL:  XHMUI
13 14543 014756 IHMD:   HMD
14 14544 014773 IHDIV:  XHDIV
15
```

```
;0216 MPRTS
01              MTST:   SETUP   ;CHECK MULTIPLY WITH
02                      LCALL SETUL
03 14545 060202         NIOC MAP
04 14546 006067         JSR @SETUL
05 14547 004527         JSR RAN
06 14550 006772         JSR @IHMUL
07 14551 022765         LDA 0,@XOAC
08 14552 026765         LDA 1,@XOMQ
09 14553 032765         LDA 2,@XOMD
10 14554 004545         JSR XMUI        ;PROGRAMED MULTIPLY
11 14555 036766         LDA 3,@IHMD
12 14556 156414         SUB# 2,3,SZR
13 14557 000405         JMP .+5
14 14560 030574         LDA 2,MAC
15 14561 034574         LDA 3,MMQ
16 14562 112415         SUB# 0,2,SNR
17 14563 136414         SUB# 1,3,SZR
18                      MLLER           ;MULTIPLY FAILED
19 14564 006706         JSR @EMUL
20                      LOOP
21                      LCALL LLOOP
22 14565 060202         NIOC MAP
23 14566 006070         JSR @LLOOP
24
25              DTST:   SETUP   ;CHECK DIVIDE WITH
26                      LCALL SETUL
27 14567 060202         NIOC MAP
28 14570 006067         JSR @SETUL
29 14571 004505         JSR RAN ;RANDOM NUMBERS.
30 14572 006752         JSR @IHDIV      ;HARDWARE DIVIDE
31 14573 020556         LDA 0,OAC
32 14574 024556         LDA 1,OMQ
33 14575 030556         LDA 2,OMD
34 14576 004537         JSR XDIV        ;PROGRAMED DIVIDE
35 14577 034557         LDA 3,MMD
36 14600 156414         SUB# 2,3,SZR
37 14601 000405         JMP .+5
38 14602 030552         LDA 2,MAC
39 14603 034552         LDA 3,MMQ
40 14604 112415         SUB# 0,2,SNR
41 14605 136414         SUB# 1,3,SZR
42                      DIVER           ;DIVIDE FAILED
43 14606 006663         JSR @EDIV
44                      LOOP
45                      LCALL LLOOP
46 14607 060202         NIOC MAP
47 14610 006070         JSR @LLOOP
```

```
;0217 MPRTS
01 14611 020456 MDTST:  LDA 0,M100      ;MULTIPLY DIVIDE TEST
02 14612 040427         STA 0,FOB
03                      SETUP
04                      LCALL SETUL
05 14613 060202         NIOC MAP
06 14614 006067         JSR @SETLL
07 14615 004461         JSR RAN
08 14616 004555         JSR XMDIV       ;HARD DIVIDE
09 14617 040451         STA 0,D0
10 14620 044451         STA 1,D1
11 14621 050451         STA 2,D2
12 14622 004537         JSR XMMUL       ;HARD MULTIPLY
13 14623 034530         LDA 3,OMD
14 14624 156414         SUB# 2,3,SZR
15 14625 000415         JMP MDT2
16 14626 030523         LDA 2,OAC
17 14627 034523         LDA 3,OMC
18 14630 112415         SUB# 0,2,SNR
19 14631 136414         SUB# 1,3,SZR
20 14632 000410         JMP MDT2
21              MDT1:   LOOP
22                      LCALL LLOOP
23 14633 060202         NIOC MAP
24 14634 006070         JSR @LLOOP
25 14635 010404         ISZ FOB
26 14636 000755         JMP MDTST+2
27 14637 002401         JMP .+1
28 14640 015051         MDTEX
29 14641 000000 FOB: 0
30 14642 020507 MDT2:   LDA 0,OAC       ;EITHER MUL OR DIV
31 14643 024507         LDA 1,OMC       ;FAILED , TYR TO FIND
32 14644 030507         LDA 2,OMD       ;WHICH ONE.
33 14645 004470         JSR XDIV
34 14646 034422         LDA 3,D0
35 14647 116414         SUB# 0,3,SZR
36 14650 000407         JMP MDT3
37 14651 034420         LDA 3,D1
38 14652 136414         SUB# 1,3,SZR
39 14653 000404         JMP MDT3
40 14654 034416         LDA 3,D2
41 14655 156415         SUB# 2,3,SNR
42 14656 000403         JMP .+3
43              MDT3:   DIVER           ;ITS A DIVIDE ERROR
44 14657 006612         JSR @EDIV
45 14660 000753         JMP MDT1
46 14661 040470         STA 0,OAC
47 14662 044470         STA 1,OMC
48 14663 050470         STA 2,OMD
49 14664 004435         JSR XMUL
50                      MULER           ;ITS A MULTIPLY ERR
51 14665 006605         JSR @EMUL
52 14666 000745         JMP MDT1
53 14667 177700 M100:   -100
54 14670 000000 D0: 0
55 14671 000000 D1: 0
56 14672 000000 D2: 0
```

```
;0218 MPRTS
01 14673 000000 OKAC: 0
02 14674 000000 OKMQ: 0
03 14675 000000 OKMD: 0
04
05 14676 054422 RAN:    STA 3,RANRET    ;GET RANDOM OPERATORS
06              RAN1:   LCALL ARANG
07 14677 060202         NIOC MAP
08 14700 006062         JSR @ARANG
09 14701 110700         NEGS 0,2        ;FORM MQ*MD
10 14702 105120         MOVZL 0,1
11 14703 127100         ADDL 1,1
12 14704 107300         ADDS 0,1
13 14705 112415         SUB# 0,2,SNR
14 14706 000771         JMP RAN1        ;REJECT IF AC=MD
15 14707 142432         SUBZ# 2,0,SZC
16 14710 115001         MOV 0,3,SKP
17 14711 000403         JMP .+3
18 14712 141000         MOV 2,0         ;MAKE AC LESS THAN
19 14713 171000         MOV 3,2         ;MD IN ALL CASES.
20 14714 040435 RAN2:   STA 0,OAC       ;STORE IN ORIGIONAL
21 14715 044435         STA 1,OMC       ;NUMBER BLOCK..
22 14716 050435         STA 2,OMD
23 14717 002401         JMP @RANRET
24 14720 000000 RANRET: 0
25 14721 054436 XMUL:   STA 3,MSAV      ;PROGRAMED MULTIPLY
26 14722 034436         LDA 3,M20
27 14723 125203         MOVR 1,1,SNC
28 14724 101201         MOVR 0,0,SKP
29 14725 143220         ADDZR 2,0
30 14726 175404         INC 3,3,SZR
31 14727 000774         JMP XMUL+2
32 14730 125260         MOVCR 1,1
33 14731 040742 XMUL1:  STA 0,OKAC      ;STORE RESULTS
34 14732 044742         STA 1,OKMQ
35 14733 050742         STA 2,OKMD
36 14734 002423         JMP @MSAV
37
```

```
10219 MPRTS
01 14735 054422 XDIV:   STA 3,MSAV      ;PROGRAMED DIVIDE
02 14736 142432         SUBZ# 2,0,SZC
03 14737 001400         JMP 0,3         ;OV EXIT
04 14740 034420         LDA 3,M20
05 14741 125120         MOVZL 1,1
06 14742 101100 XDIV1:  MOVL 0,0
07 14743 142412         SUB# 2,0,SZC
08 14744 142400         SUB 2,0
09 14745 125100         MOVL 1,1
10 14746 175404         INC 3,3,SZR
11 14747 000773         JMP XDIV1
12 14750 000761         JMP XMUL1       ;STORE RESULTS.
13 14751 000000 OAC: 0
14 14752 000000 OMQ: 0
15 14753 000000 OMD: 0
16 14754 000000 MAC: 0
17 14755 000000 MMQ: 0
18 14756 000000 MMD: 0
19 14757 000000 MSAV: 0
20 14760 177760 M20: -20
```

```
10220 MPRTS
01
02
03 14761 054423 XMMUL:  STA 3,XMRET     ;HARDWARE MULTIPLY
04 14762 073301         DSPP 2,01
05 14763 004402         JSR .+2
06 14764 014764         .
07 14765 043767         STA 0,MAC
08 14766 020776         LDA 0,.-2
09 14767 116434         SUBZ# 0,3,SZR
10 14770 000415         JMP MERR
11 14771 020763         LDA 0,MAC
12 14772 000406         JMP XMCOM
13
14 14773 054411 XMDIV:  STA 3,XMRET     ;HARDWARE DIVIDE
15 14774 176440         SUBO 3,3
16 14775 073101         DSPS 2,01
17 14776 175004         MOV 3,3,SZR
18 14777 000413         JMP DERR
19 15000 043754 XMCOM:  STA 0,MAC       ;STORE HARDWARE RESULTS.
20 15001 044754         STA 1,MMQ
21 15002 050754         STA 2,MMD
22 15003 002401         JMP #XMRET
23 15004 000000 XMRET: 0
24
25 15005 054412 MERR:   STA 3,MERET     ;MULTIPLY ERROR
26 15006 101001         MOV 0,0,SKP
27 15007 015054         MULMED          ;HEADING FOR MUL.
28 15010 020777         LDA 0,.-1
29 15011 000407         JMP GRR
30
31 15012 054405 DERR:   STA 3,MERET     ;DIVIDE ERROR
32 15013 101001         MOV 0,0,SKP
33 15014 015066         DIVMED
34 15015 020777         LDA 0,.-1
35 15016 000402         JMP GRR
36 15017 000000 MERET: 0
```

```
10221 MPRTS
01 15020 040433 GBR:    STA 0,XHDR      ;PRINT GOOD-BAD RESULTS
02                      LCALL ERROI
03 15021 060202         NIOC MAP
04 15022 006065         JSR @ERRCI
05 15023 000403         JMP .+3
06 15024 101001         MOV 0,0,SKP
07 15025 020426         LDA 0,XHDR
08                      LCALL ERRTX
09 15026 060202         NIOC MAP
10 15027 006060         JSR @ERRTX
11 15030 020721         LDA 0,OAC
12 15031 024721         LDA 1,OMC
13 15032 030721         LDA 2,OMC
14                      LCALL ERROC
15 15033 060202         NIOC MAP
16 15034 006066         JSR @ERRCC
17 15035 000401         JMP .+1
18 15036 020716         LDA 0,HAC
19 15037 024716         LDA 1,HMC
20 15040 030716         LDA 2,HMC
21                      LCALL ERROC
22 15041 060202         NIOC MAP
23 15042 006066         JSR @ERRCC
24 15043 020630         LDA 0,OKAC
25 15044 024630         LDA 1,OKMC
26 15045 030630         LDA 2,OKMD
27                      LCALL ERROC
28 15046 060202         NIOC MAP
29 15047 006066         JSR @ERRCC
30 15050 000401         JMP .+1
31              MDTEX:  LCALL RETRN
32 15051 060202         NIOC MAP
33 15052 006061         JSR @RETRN
34
35 15053 000000 XHDR:   0
36 15054 005215 MULHED: .TXTE 1<15><12>
37 15055 052515 MUL<15><12>AC0  AC1     AC2 !
38       106714
39       040412
40       030303
41       040411
42       130703
43       040411
44       131303
45       000240
46 15066 005215 DIVHED: .TXTE 1<15><12>
47 15067 144504 DIV<15><12>AC0  AC1     AC2 !
48       106526
49       040412
50       030303
51       040411
52       130703
53       040411
54       131303
55       000240
56
57
```

```
10222 MPRTS
                        .TITL MPRTS
02                      ;LAST TAPE OF MULTIPROGRAMING RELIABILITY TEST
03 15100 000000 EXISM:  0
04 15101 000000         0
05 15102 000000         0
06 15103 000000         0
07 15104 000000         0
08 15105 000000         0
09 15106 000000         0
10 15107 000000         0
11 15110 000000 AVALM:  0
12 15111 000000         0
13 15112 000000         0
14 15113 000000         0
15 15114 000000         0
16 15115 000000         0
17 15116 000000         0
18 15117 000000         0
19 15120 000000 DCHM0:  0
20 15121 000000 DCHM1:  0
21 15122 000000 LSYSE:  0
22
23 15123 047503         .TXT    /COPYRIGHT (C) DGC,1973,1974
24       054520
25       044522
26       044107
27       020124
28       041450
29       020051
30       043504
31       026103
32       034461
33       031467
34       030454
35       033471
36 15148 040464 ALL RIGHTS RESERVED/
37       046114
38       051040
39       043511
40       052110
41       020123
42       042522
43       042523
44       053122
45       042105
46       000000
47
48       001000         .LOC 1000
49 01000 000000         0
50 01001 000125         LPG0
51 01002 000000         0
52 01003 000000         0
53 01004 015122         LSYSE
54
55                      .END
```

	101/32	105/15	107/17	107/21	108/11	108/16	108/20	
	109/12	109/17	112/15	112/18	119/13			
CALLE 002216	32/06	32/46						
CALLS 002215	32/03	32/45						
CAMK1 013420	191/12	193/35	193/41	195/18				
CARDG 013352	192/21	192/32						
CARDS 013515	192/24	192/33	195/07	195/45	196/33	197/03		
CARDX 013564	196/34	196/37	196/41					
CAREW 013501	194/09	195/33	195/37	197/27				
CASTA 013421	193/07	193/42	197/19					
CATTX 013512	195/36	195/42	196/28	196/31	196/36	197/18		
CATX1 013625	197/14	197/44						
CAWTX 013422	193/17	193/43						
CA,00 013226	185/12	185/16	186/20	187/11	194/31			
CA,01 013050	185/15	186/07						
CA,02 013103	185/17	187/11						
CA,03 013171	188/24	189/04						
CA,04 013516	193/19	196/03	196/14	197/05				
CA,05 013566	195/14	197/02						
CA,10 013506	195/33	195/38						
CA,1A 013065	186/11	186/20						
CA,1B 013067	186/16	186/19	186/24					
CA,2C 013137	187/33	187/37	188/05	188/33	196/42			
CA,2L 013126	187/34	187/44						
CA,2R 013161	187/41	188/29						
CA,3 013166	188/21	188/36						
CA,3A 013201	189/08	189/12						
CA,3R 013320	189/13	192/05						
CA,6 013167	187/26	188/37						
CA,BK 013252	188/23	189/19	189/24	190/04	191/19	192/07	192/10	
	193/32	195/44						
CA,BL 013253	189/33	190/05	191/06					
CA,CA 013266	190/17	191/23	192/13	193/23	193/26	193/30	194/22	
	195/08	195/11						
CA,DX 013510	195/40	196/04	196/12					
CA,EK 013317	191/30	192/26	195/24	197/43				
CA,ID 013357	187/06	193/05						
CA,K1 013100	186/28	187/04						
CA,K2 013101	186/29	187/05						
CA,K3 013102	186/30	187/06						
CA,KK 013251	187/28	187/42	188/19	190/03				
CA,NR 013507	195/26	195/39						
CA,RC 013466	194/30	195/13	195/17					
CA,RE 013474	193/11	194/21	195/06	195/24				
CA,RI 013452	194/28	195/05						
CA,RK 013267	190/18	191/20	192/11	193/28	193/33	195/12		
CA,TT 013250	186/27	189/04	189/11	189/26	190/02	192/05	194/25	
CA,WB 013436	192/18	192/32	194/12	194/20				
CA,WE 013423	193/16	194/06						
CA,WI 013367	191/16	193/15	194/23					
CA,WM 013376	193/18	193/23						
CA,WN 013411	193/34	194/27						
CA,X2 013615	197/33	197/37						
CA,XI 013611	185/22	185/23	188/35	196/40	197/28	197/32		
CA,XX 013165	187/17	187/21	188/35	189/10				
CB10K 004757	76/14	76/21						
CB17 004754	76/09	76/18						
CB37 004756	76/13	76/20						

CB400 004755	76/10	76/19					
CBBG2 004713	72/46	75/12					
CBLIM 001757	19/45	27/07					
CBLWR 002010	27/17	27/19	27/23	27/24	27/32		
CBPL2 004714	72/18	72/35	75/13				
CBTXT 004723	74/07	75/20					
CBUPR 002011	27/18	27/25	27/33				
CB,00 004473	70/13	70/17					
CB,01 004512	70/17	71/02					
CB,02 004515	70/18	71/07					
CB,03 004617	71/08	73/04					
CB,04 004644	73/13	73/32	74/20				
CB,05 004736	74/25	76/03					
CB,2A 004541	71/24	71/28	72/04				
CB,2C 004553	72/16						
CB,2L 004534	71/25	71/30					
CB,37 004702	71/18	75/03					
CB,BG 004705	72/28	75/06					
CB,EC 004655	70/23	70/24	74/06				
CB,EN 004706	72/44	73/19	75/07				
CB,ER 004652	73/21	74/02	79/39				
CB,ES 004712	71/14	74/19	74/22	75/11			
CB,F1 005065	79/07	79/20					
CB,F2 005070	79/10	79/14					
CB,F3 005075	79/08	79/15					
CB,F4 005103	79/18	79/21					
CB,F5 005107	79/23	79/25					
CB,FA 005061	75/18	79/03					
CB,L2 004570	72/29	72/34					
CB,L3 004611	72/47	72/52					
CB,LC 004704	72/25	72/40	73/08	74/12	74/26	75/05	
CB,PL 004703	72/16	74/27	75/04				
CB,RL 004565	72/26	74/28					
CB,SE 004711	73/11	74/02	74/13	75/10			
CB,TI 004707	73/10	73/32	73/33	75/08			
CB,TK 004701	71/03	71/07	73/04	73/27	74/11	74/23	75/02
CB,TS 004715	73/05	75/14					
CB,WK 005124	79/26	79/38					
CB,X1 004635	71/12	73/22	73/26	74/17	76/08	76/17	
CB,X2 004672	73/35	74/22					
CCTR 002074	29/21	29/24	29/27	29/34	29/39		
CDISP 002101	10/17	31/03					
CD,EX 002162	31/39	32/17	33/16	44/47			
CD,LA 002210	31/14	31/36	32/19	32/20	32/23	32/27	32/33
	32/40	33/04	43/09	44/48			
CD,LP 002211	31/17	32/24	32/41	33/05	43/08	44/49	
CD,PP 002212	31/24	31/32	32/42	33/15			
CD,S0 002203	31/03	32/11	32/21	32/29	32/35	33/09	
CD,S1 002204	31/04	32/12	32/22	32/28	32/36	33/10	
CD,S2 002205	31/05	32/13	32/37	33/11			
CD,S3 002206	31/06	32/38	33/14	43/17	46/45		
CHAR 003241	48/38	48/41	49/31	50/01	50/27		
CHAR1 003251	50/09						
CHA,3 003256	50/11	50/14	50/19				
CHECK 005042	78/10	78/13	78/15				
CHORZ 003276	50/16	50/20	50/32	51/20	51/23		
CHRET 003275	50/01	50/13	50/21	50/31			
CK1 014511	214/07	214/13	214/16				

```
IHMD  014543      215/13  216/11
IHMUL 014542      215/12  216/06
IIOVL 000050       10/15   15/22
IMCK  014301      205/12  205/33  206/13  206/34  207/14  207/35  208/13
                  208/34  208/45
IOMES 003642       55/25   55/30   55/37   56/26   57/23
IORLM 003641       57/08   57/22
IOTX2 003660       56/27   57/38
IOTX3 003753       55/31   59/01
IOTX4 003762       55/38   59/08
IOTXI 003643       55/26   57/24
IOVAL 003523       10/15   55/06
IOVPR 003550       55/27   56/28
IOV,0 003630       55/06   55/32   56/07   57/13
IOV,1 003631       55/07   55/33   56/08   57/14
IOV,2 003632       55/08   55/34   56/09   57/15
IOV,3 003633       55/09   55/39   56/10   57/07   57/12   57/16
IOV,4 003634       55/11   55/40   56/12   57/17
IOV,A 003635       55/16   55/27   56/17   57/18
IOV,B 003636       55/17   56/18   57/19
IOV,C 003637       55/18   56/19   57/20
IOV,E 003621       33/23   55/22   55/45   56/23   57/06
IOV,R 003640       55/24   55/41   56/25   57/21
IPAT  004772       77/14   77/39
IPAT1 004776       77/18   77/35
ISTZM 001223       15/35   15/43
IXTOR 014277      205/06  205/27  206/07  206/28  207/08  207/29  208/07
                  208/28  208/43  209/06  209/27  210/07  210/27  211/07
                  211/27  212/07  212/28  213/07
K1174 002214       31/25   32/44
K17   002100       29/18   29/43
K1777 002207       31/10   32/39
K1K   001304       17/12   17/37
K32K  001346       18/17   18/19   18/20   18/21   18/36
K37   001307       17/25   17/40   18/31
K377  002217       31/22   32/47
K37C  002012       27/14   27/34
KAVLM 002007       27/20   27/31
KAVMP 001365       19/05   19/16
KCRLF 003053       46/32   46/49
KEXMP 001364       19/04   19/15
KLETB 001413       19/35   19/44
KLSTB 001412       19/34   19/43
KLZMX 001222       15/34   15/42
KM8   001306       19/06   19/17
KNMAX 001406       19/26   19/39
KSTFS 001411       19/32   19/42
KSTSS 001410       19/31   19/41
KUP32 001407       19/28   19/40
KXIST 001310       17/27   17/41   18/25
K,377 002036       28/19   28/27
LAUTO 001026       11/12   11/28   64/06
LCALL 000000  MC   11/30   71/09   71/15   71/20   71/25   72/04   72/11
                   73/22   73/28   73/36   74/03   74/08   74/14   76/03
                   84/05   84/11   84/17   85/26   86/10   86/15   86/30
                   86/40   86/46   87/07   87/12   87/18   87/23   87/33
                   89/04   89/08   89/17   89/21   89/27   89/31   89/40
                   89/44   90/03   90/11   90/18   90/25   90/29   91/04
                   91/08   91/33   91/37   92/05   92/09   92/34   92/38
                   93/04   93/08   93/26   93/30   93/36   93/40   93/48
                   93/52   94/04   94/08   94/28   94/32   95/06   95/10
                   95/24   95/28   95/34   95/38   95/51   95/55   96/04
                   96/08   96/22   96/26   96/32   96/36   96/47   96/51
                   97/04   97/08   97/19   97/23   97/29   97/33   97/45
                   97/49   99/03   99/07   99/18   99/22   99/28   99/32
                   99/43   99/47  100/04  100/16  100/20  100/26  100/38
                  100/42  101/04  101/08  101/39  101/43  102/03  102/07
                  102/17  102/21  102/27  102/31  102/41  102/45  103/03
                  103/07  103/17  103/21  103/26  103/30  103/52  103/56
                  104/04  104/08  104/24  104/28  105/04  105/08  105/24
                  105/28  105/34  105/38  105/46  105/50  106/04  106/08
                  106/24  106/28  107/07  107/11  107/28  107/32  108/04
                  108/08  108/27  108/31  109/04  109/08  109/24  109/28
                  112/03  112/07  112/26  112/34  112/42  112/46  113/04
                  113/22  113/26  114/04  114/21  114/25  115/04  115/11
                  115/18  115/25  115/32  115/39  115/46  115/53  115/60
                  116/07  116/14  116/18  117/03  117/11  117/18  117/25
                  117/32  117/39  117/46  117/53  117/60  118/07  118/11
                  119/04  119/08  119/20  119/24  119/30  119/44  119/48
                  120/04  120/08  120/18  120/22  120/28  120/32  120/41
                  120/45  121/04  121/23  121/27  121/33  121/37  121/51
                  121/55  122/04  122/08  122/19  122/23  123/04  123/08
                  123/19  123/23  123/29  123/33  123/44  123/48  124/04
                  124/08  124/19  124/23  124/29  124/33  124/44  124/48
                  125/04  125/12  125/23  125/27  125/31  128/08  128/12
                  128/16  128/20  129/04  129/09  129/13  129/35  132/17
                  132/23  132/29  132/34  133/03  133/08  133/14  134/24
                  134/29  134/35  138/08  138/12  138/16  138/23  138/28
                  138/32  139/03  139/08  139/23  140/04  140/11  140/22
                  141/07  141/31  141/36  143/44  145/27  145/35  145/41
                  145/46  145/52  146/06  146/11  146/17  146/22  146/28
                  150/07  150/13  150/18  150/23  151/08  151/13  152/12
                  152/19  152/51  153/05  153/11  153/34  154/07  154/12
                  154/18  154/23  154/29  154/34  154/40  154/45  154/57
                  157/20  158/48  159/12  160/27  162/22  162/37  165/14
                  165/18  165/22  165/29  165/34  165/38  166/05  166/10
                  167/05  168/14  168/21  168/34  168/40  170/25  171/29
                  171/34  177/05  177/10  177/18  177/23  177/28  177/34
                  180/22  180/32  180/36  180/42  182/51  187/14  187/18
                  187/22  187/29  187/34  187/38  188/05  188/10  188/29
                  189/14  189/21  189/34  189/40  191/25  192/29  192/34
                  197/10  197/15  197/23  197/28  197/33  197/39  199/15
                  199/30  199/37  200/03  200/09  200/18  205/02  205/17
                  205/23  205/38  206/03  206/18  206/24  206/39  207/04
                  207/19  207/25  207/40  208/03  208/18  208/24  208/39
                  209/02  209/17  209/23  209/38  210/03  210/17  210/23
                  210/38  211/03  211/17  211/23  211/38  212/03  212/18
                  212/24  212/39  213/03  213/18  216/02  216/21  216/26
                  216/45  217/04  217/22  218/06  221/02  221/08  221/14
                  221/21  221/27  221/31

LCINT 003460       12/07   54/23   54/29
LC,K1 003517       54/33   54/35   54/54
LC,K2 003515       54/47   54/52
LDCHL 004203       12/21   60/33   63/25
LDCHM 004166       60/31   61/50   62/28   63/07
LDC,0 004200       63/07   63/15   63/18
```

```
MH,BK 010336    139/21  140/09  140/14  142/14  143/23
MH,C0 010477    144/18  144/39  144/49
MH,CD 010351    142/25  143/10  144/19  146/44
MH,CX 010613    146/26  146/44
MH,IS 010430    137/36  144/05  144/07  144/16  144/29  144/42  144/47
                145/51
MH,K1 010110    137/27  137/34
MH,K2 010111    137/28  137/35
MH,K3 010112    137/29  137/36
MH,KK 010330    138/22  138/36  139/17  142/08
MH,OC 010352    142/26  143/31  144/20  146/45
MH,OX 010614    146/27  146/45
MH,S3 010113    137/30  137/32  137/37
MH,SA 010612    146/05  146/14  146/43
MH,SC 010350    142/24  143/41
MH,SX 010554    145/40  145/55
MH,WC 010347    140/47  142/23
MH,WK 010346    140/21  140/41  142/22  143/35  145/18
MH,X2 010545    145/46  145/50
MH,XI 010541    136/22  136/23  139/28  145/41  145/45  146/31  146/32
MH,XX 010201    138/11  138/15  139/28
MODUA 005114     77/13   79/30
MPF32 001347     18/14   18/37
MPSWT 000077     10/42   13/14   13/23   16/16   35/12   39/15   41/13
                 42/06   42/33   45/16   46/11   60/15   61/18   62/23
                 64/15
MPXTX 004362     64/16   68/01
MPYA  006500    110/03  112/20  114/32
MPYAL 006745    114/32  119/14
MPYU  006557    107/19  108/18  110/02
MP,K1 001205     15/03   15/22
MP,K2 001206     15/05   15/23
MP,K3 001207     15/07   15/24
MSI   005525     88/03   88/05   89/03
MSI28 001312     16/19   18/08   18/29
MSAV  014757    218/25  218/36  219/01  219/19
MSEL  002467     38/15   38/30
MSKRG 003446     48/51   51/11   52/30   52/51   53/13   53/38   54/50
MSZ32 001251     16/06   17/10   17/34
MS,L1 001311     17/28   17/42   18/26
MT00X 012273    170/17  171/22  172/05  172/20  173/13  173/24  173/29
                173/31  174/15  174/27  177/33
MT10  011721    164/24  165/03
MT256 012012    166/09  167/14
MT40  012241    171/27  172/40  173/14
MT50  012140    170/18  170/29  172/37
MT64, 012137    168/18  170/28
MT7TM 012431    176/11  176/19
MTBK1 012251    173/10  174/25
MTBKX 012336    174/44  175/15  176/04
MTBSW 012200    170/22  171/19  171/23  171/37
MTCST 012077    166/18  169/07  170/14  171/12  172/27
MTCTB 012101    169/02  169/10  172/43  174/42  175/41
MTDER 012432    174/39  175/09  175/23  177/05
MTDST 012076    166/15  168/44  169/06  174/43
MTDSX 012335    174/43  175/05
MTDW1 012104    168/37  169/09  169/13  174/40
MTDW2 012105    168/38  169/14
```



```
MTDW3 012106    168/39  169/15
MTDW4 012107    168/43  169/16  174/41
MTDWX 012100    168/45  169/09
MTEKX 012464    177/15  177/38
MTFIL 012112    168/54  170/06
MTFLX 012407    175/32  175/39  175/42
MTMK1 012242    170/12  172/35  172/41  174/18
MTRDG 012174    171/21  171/32
MTRDS 012337    171/24  171/33  174/07  174/45  175/33  176/03
MTRDX 012406    175/34  175/37  175/41
MTREW 012323    173/09  174/33  174/37  177/22
MTST  014545    213/24  216/01
MTSTA 012243    172/07  172/42  177/14
MTTTX 012334    174/36  174/42  175/28  175/31  175/36  177/13
MTTX1 012465    177/09  177/39
MTWTX 012244    172/17  172/43
MT,00 011650    163/11  163/15  164/20  165/11  173/31
MT,01 011672    163/15  164/07
MT,02 011725    163/16  165/11
MT,03 012013    166/24  168/04
MT,04 012340    172/19  175/03  175/14  176/08  176/18
MT,05 012410    174/14  176/02
MT,10 012330    174/33  174/38
MT,1A 011707    164/11  164/20
MT,1B 011711    164/16  164/19  164/24
MT,2C 011761    165/33  165/37  166/05  167/09  175/42
MT,2L 011750    165/34  165/44
MT,2R 012003    165/41  167/05
MT,3  012010    166/21  167/12
MT,3A 012023    168/06  168/12
MT,3R 012142    168/13  171/05
MT,6  012011    165/26  167/13
MT,BK 012074    166/23  168/19  168/24  169/04  170/19  171/07  171/18
                172/32  174/44
MT,BL 012075    168/33  169/05  170/06
MT,CA 012110    169/17  170/23  171/13  172/23  172/26  172/30  173/22
                174/08  174/11
MT,DX 012332    174/40  175/04  175/12  176/09  176/13
MT,EK 012141    170/30  171/26  174/24  177/32
MT,ID 012261    165/06  172/05
MT,K1 011722    164/28  165/04
MT,K2 011723    164/29  165/05
MT,K3 011724    164/30  165/06
MT,KK 012073    165/28  165/42  166/19  169/03
MT,NR 012331    174/26  174/39
MT,RC 012310    173/30  174/13  174/17
MT,RE 012316    172/11  173/21  174/06  174/24
MT,RI 012274    173/28  174/05
MT,RK 012111    169/18  170/20  171/11  172/28  172/33  174/12
MT,TT 012072    164/27  168/04  168/11  168/26  169/02  171/05  173/25
MT,WB 012260    171/18  171/32  173/12  173/20
MT,WE 012245    172/16  173/06
MT,WI 012211    170/16  172/15  173/23
MT,WM 012220    172/18  172/23
MT,WN 012233    172/34  173/27
MT,X2 012455    177/28  177/32
MT,XI 012451    163/21  163/22  167/11  175/40  177/23  177/27
MT,XX 012007    165/17  165/21  167/11  168/19
```